
MC
MC2000
The Complete Multi-Band Compressor
User Manual
McDOWELL SIGNAL PROCESSING, LLC

McDSP MC2000 Plug-In Manual

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Table of Contents

McDSP MC2000 Plug-In Manual ii

McDSP License Agreement vi

Getting Started with MC2000 ***viii***

System Requirements viii
Installing the MC2000 Plug-In x
Installation on Mac OS X x
Installation on Windows XP and Vista xii
Installation on VENUE D-SHOW systems xiv
Authorizing your McDSP Plug-Ins xvi
Authorizing with a pre-programmed iLok Smart Key xvi
Authorizing with an iLok License Card xvi
Authorizing with iLok.com xx
Registering your McDSP Plug-In xxiii
Using your McDSP Plug-Ins xxiii

MC2000 1

Quick Start Tour: MC2000 ***3***

The MC2000 4-band Configuration Overview 3
Compressor (x4 in this example): 4
TC Circuit: 4
Crossover Display: 4
Compression Display: 5
Mastering Section: 5
Control Linking 6
To link the Right and Left Output Controls of stereo versions: 6
To link the compression bands: 7
The Meters 8
The Crossover and Compression Displays 8
Crossover Frequency Response Graph 8
Automation 9
Presets: Using the Presets and Making Your Own 10
A Word on Preset Compatibility 10

Using the MC2000 Plug-In ***11***

A Closer Look at the MC2000 Compressors 11
Output/Gain Stage 11
Compressor 11
Attack and Release 13
Time Constant Circuits 14
A Closer Look at the MC2000 Crossover 15
Crossover Control 15
A Closer Look at the MC2000 Master Section 16
Input and Output 16
Compression Band Linking 16
Modeling Analog Compressors with the MC2000 18
Teletronix LA2A™ 18
UREI 1176 LN™ (blackface) 19
Neve 2254E/33609™ 20
dbx 165™ 21
Avalon Designs AD2044™ 22
Other MC2000 Presets 24

MC2000 Plug-In Reference Guide ***25***

MC2000 Specifications 25
MC2000 2-Band Mono & Stereo (MC2) 27
MC2000 3-Band Mono & Stereo (MC3) 28
MC2000 4-Band Mono & Stereo (MC4) 29
Linked Control Table 30
DSP Delay 30
DSP Usage 30
HD and HD Accel DSP hardware 30
Maximum Instantiation Counts at 44100 31
Percentage of DSP used by one instantiation at 44100 31
ProToolsI24, Nubus, and MIX DSP hardware 32

MC2000 Frequently Asked Questions ***33***

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Getting Started with MC2000

Each McDSP plug-in is delivered inside an installer application, and uses the Interlok copy protection software to authorize each plug-in. This section describes how to install and authorize a McDSP plug-in. General system requirements are also described.

System Requirements

McDSP HD, Native, and LE plug-ins are compatible with Pro Tools™ HD, HD Accel TDM systems, as well as Pro Tools™ LE and Pro Tools™ M-Powered host based systems. McDSP plug-ins support Mac OS 10.4.x (Tiger), 10.5.x (Leopard), Windows XP and require Pro Tools 7.x, 8.x or greater. McDSP plug-ins require an iLok USB Smart Key.

Configurations

McDSP plug-ins are available in TDM, RTAS, and AudioSuite configurations. See individual products for specific available configuration sets.

Applications

Pro Tools™ 7.x, 8.x or higher is required for TDM, LE, and M-Powered systems. Additionally, a third party software application that supports the Digidesign TDM, RTAS, or AudioSuite plug-in standard may be supported. See http://www.digidesign.com/developers/plugin_info/ for more information.

McDSP plug-ins are compatible with the entire Pro Tools™ 7 and 8 product line.

Hardware

McDSP plug-ins support any Digidesign or approved third party hardware supported in Pro Tools™ 7.x and 8.x. This includes HD, HD Accel, 003, and Mbox host based systems. All McDSP HD plug-ins, except Synthesizer One, also support the Digidesign VENUE D-SHOW systems. See http://www.digidesign.com/compato/ for more specific information.

The McDSP Mac versions are compatible with both Intel and PowerPC based computers. The McDSP Windows versions require an Intel Pentium 4 or greater processor.*

** McDSP Windows test machines are chosen to follow the Digidesign recommended systems guide, which currently is the Dell Precision™ Workstation 670 with 2.79 GHz Xeon processor. All products are guaranteed to run on that system. Older Intel processors (i.e. Pentium III and predecessors) and AMD processors are not officially supported, although some users have had limited success with newer AMD processors (i.e. Dual Opteron 1.79 GHZ, Athlon 64 2.20 GHz, and Athlon 64 XP 3700). None of McDSP Windows product line will work with Pro Tools™ 5.x. Also note the McDSP Windows product line does not support MIX, although RTAS versions will work if they exist and the rest of your system (i.e. Pro Tools™ version and processor) is compatible.*

Please visit mcdsp.com for the latest information about compatibility.

Installing the MC2000 Plug-In

Installation on Mac OS X

The MC2000 plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the MC2000 plug-in, and the MC2000 plug-in. Two copies of the MC2000 Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The MC2000 plug-in manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a MC2000 installer that will automatically install the MC2000 plug-in and its presets on your system. The authorization of the MC2000 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the MC2000 plug-in and presets with the Installer:

The online version of the package has been prepared for Internet delivery, and is transmitted as a compressed file in zip format (.zip). In Mac OS X 10.4.x or 10.5.x, simply double click the *.zip file to unpack the installer. The boxed plug-in package purchased at your local dealer will be on CDROM. As with the online version, these 'physical' versions of the MC2000 plug-in package should be copied into a local folder on your system.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the MC2000 plug-in folder on the CDROM - the installer application is contained therein.
- Run the MC2000 plug-in Installer application to install (copy) the MC2000 plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the MC2000 plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the MC2000 plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the 'Plug-in Settings' folder:
- Root->Library->Application Support->Digidesign->Plug-in Settings
- If Pro Tools™ has not already done so for you, create a folder called 'MC2000'.
- Place a copy of the folder from the MC2000 plug-in package called 'Presets' into the 'MC2000' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the MC2000 plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the MC2000 plug-in window toolbar.

Installation on Windows XP and Vista

The MC2000 plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the MC2000 plug-in, and the MC2000 plug-in. Two copies of the MC2000 Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The MC2000 manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a MC2000 installer that will automatically install the MC2000 plug-in and its presets on your system. The authorization of the MC2000 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the MC2000 plug-in and presets with the Installer:

The MC2000 plug-in package purchased at your local dealer will be on CDROM and contain a Windows self extracting executable (.exe) similar to the online MC2000 plug-in package prepared for Internet delivery. Both the boxed and online versions the MC2000 plug-in executable file will automatically install the plug-in and its presets on your system. Double click the file to launch the installer which will install the MC2000 plug-in, presets, and documentation. At any time after installation, you may access the documentation from the Windows 'Start Menu' under the 'McDSP' group.

Authorization of the MC2000 plug-in is still required after running the installer, and those steps are detailed in the following sections. Note that after installing new versions of the PACE iLok drivers with the MC2000 plug-in installer, you will be prompted by the MC2000 plug-in installer to reboot your system. If you are not prompted by the installer, there is no need to reboot.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the MC2000 plug-in folder on the CDROM - the installer application is contained therein.
- Run the MC2000 plug-in Installer application to install the MC2000 plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the MC2000 plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the MC2000 plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the Plug-In Settings folder:
- C:\Program Files\Common Files\Digidesign\DAE\Plug-In Settings\
- If Pro Tools™ has not already done so for you, create a folder called 'MC2000'.
- Place a copy of the folder from the MC2000 plug-in package called 'Presets' into the 'MC2000' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the MC2000 plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the MC2000 plug-in window toolbar.

Installation on VENUE D-SHOW systems

The MC2000 plug-in Package for VENUE D-SHOW systems includes presets for the MC2000 plug-in and the MC2000 plug-in. The MC2000 Licensing Agreement is displayed when installing the product on D-SHOW. The pdf manual can be obtained by running the Mac OS X or Windows XP/Vista version of the MC2000 Pro Tools plug-in installer on any available computer.

Both online and boxed versions will come with a VENUE compatible installer that will automatically install the MC2000 plug-in and its presets on your system. The authorization of the MC2000 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Note that all McDSP HD plug-ins, except Synthesizer One support the Digidesign VENUE D-SHOW system.

Installing the MC2000 plug-in and presets on VENUE with the 'HD Disk':

The boxed MC2000 plug-in package purchased at your local dealer will contain a CDROM titled 'HD Disk' that is specially formatted to work with your VENUE console. The VENUE installers are also available online as a compressed zip file download, however you will have to take additional steps to create your own VENUE installer CD-R, see additional instructions below before proceeding with these instructions. Both the boxed and online versions of the MC2000 installer are the same and will install both the plug-in and its presets on your system.

Note that after installing new versions of the PACE iLok drivers with the MC2000 plug-in installer, you will need to reboot your system. You will not be prompted to reboot, and if you don't you may see an error message saying "TPkd driver required, and a reboot. Please reboot or reinstall the software.' If you see this message, simply reboot the console and try again.

- Insert the McDSP 'HD Disk' CDROM onto the CD drive. Note that neither the McDSP 'Native Disk' nor the 'LE Disk' contains VENUE compatible installers.
- Ensure your system is in 'CONFIG' mode, you cannot install plug-ins in 'SHOW' mode.
- Navigate to the 'OPTIONS' page and then select the 'PLUG-INS' tab.
- You should now see the MC2000 plug-in available on the left hand side.
- Select the MC2000 plug-in and select 'INSTALL.'
- If a previous version of the MC2000 plug-in was already installed, it will be updated by the installer.

***Important note** for FilterBank HD and CompressorBank HD on VENUE*

D-SHOW consoles: The first time you instantiate either of these plug-ins, a dialog box will appear asking you to choose a user interface preference. Choose the Knobs interfaces, as some of the Slider interfaces are too large for the VENUE display.

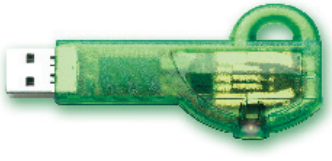
Creating a VENUE D-SHOW Installer CD-R from the online zip file:

If you do not have a boxed copy of MC2000 with the included 'HD Disk' CDROM, you can still obtain a copy of the VENUE compatible installers from the www.mcdsp.com website. Once you have located and downloaded the latest VENUE compatible installers from the McDSP website, you will have to take several additional steps to create a VENUE compatible Installer CD-R. For your convenience, all VENUE compatible products are located in the same downloadable zip file, so you will only have to create one CD-R to install all compatible McDSP products.

- Unzip the downloaded file and locate the folder named "TDM Plug-Ins" inside the unpacked folder.
- Using any CD-R burning application, burn this folder and its contents to an ISO format CD-R. It is recommended that you use a brand new CD-R for this, and do not rewrite an older CD-R.
- Once you have burned this folder to a CD-R, you should see it at the root level of the disk (i.e. "D:\TDM Plug-Ins"). Important: If the "TDM Plug-Ins" folder is not located at the root level of the CD-R or has been renamed, the VENUE console may not properly recognize the installer disk.
- At this point, you can follow the 'HD Disk' installation instructions above to complete the installation.

Authorizing your McDSP Plug-Ins

Authorizing with a pre-programmed iLok Smart Key



McDSP bundles such as the Emerald Pack come with a pre-programmed iLok Smart Key. Simply insert the iLok into any available USB port on your computer. The iLok's indicator light will illuminate when the iLok has a proper connection. The Plug-Ins included in the bundle require no further authorization steps. As with any iLok on your system it is recommended that your iLok be registered and synchronized with iLok.com

Authorizing with an iLok License Card

All McDSP Plug-Ins require that a valid authorization is present on your iLok USB Smart Key. McDSP Plug-ins that are purchased individually provide this authorization on a plastic License Card (about the size of a credit card), with a small punch-out iLok License Chip. After being separated from the License Card, this iLok License Chip is to be inserted into the 'key slot' of the iLok USB Smart Key in order to transfer the authorization from the License Card to the iLok USB Smart Key. Note that each License Card holds ONE Plug-In authorization. The following instructions detail this process

Important Note: The Authorization Wizard will prompt the user to register their iLok USB Smart Key at iLok.com. iLok.com is a service offered by PACE Anti-Piracy, Inc. and this step is recommended but NOT REQUIRED by McDSP to complete the authorization of the Plug-In. If you choose to register your iLok USB Smart Key at iLok.com, care must be taken to record your ilok.com account information (i.e. write down your User ID and Password in a safe place). If your iLok.com account information is lost, the iLok cannot be registered to another account and unfortunately there is nothing McDSP can do to help you. See iLok.com for more details about the benefits of using PACE's iLok.com service.

Note: Images in this section are for illustration only, the actual product and screens will be the name of the product you are authorizing.

Authorizing a McDSP Plug-In from a License Card with the Authorization Wizard:

The Authorization Wizard is used to install an authorization from a License Card to the iLok USB Smart Key. To use the Authorization Wizard for the Plug-In you purchase, perform the following steps:

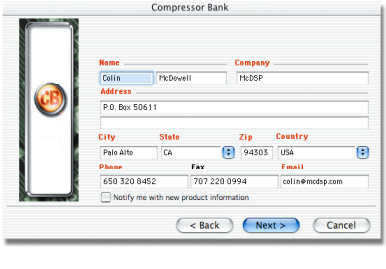
- Insert your iLok USB Smart Key into an available USB port.
- On a Mac :Locate and launch the 'Authorizer' application found in the 'Authorize' folder in the Plug-In package for the McDSP Plug-In you purchased on the CD-ROM.
- On Windows XP or Vista, just launch Pro Tools™ to authorize the individual McDSP Plug-In you purchased.

Note: When authorizing the Plug-In on Windows XP or Vista with a new iLok USB Smart Key, you must insert the iLok USB Smart Key and complete the Windows 'Found New Hardware Wizard' before attempting to authorize the Plug-In.

- Select the 'Authorize' button to be guided through the Authorization Wizard.

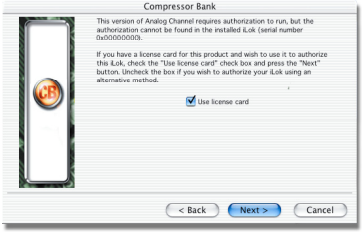
Note: Selecting the 'Quit' button at any time will not authorize the Plug-In or allow it to be used for a trial period. If 'Quit' is selected, the Plug-In will not be available in the Pro Tools™ insert menu.

- McDSP Plug-Ins require that the user personalize their copy of the Plug-In. A dialog is displayed soliciting this information.



Note that the product registration card enclosed with the Plug-In MUST ALSO be filled out as well and returned to McDSP via mail (or fax to 707-220-0994). This additional mail-in registration will entitle the user to future upgrades and advance information from McDSP.

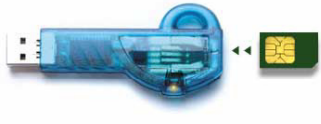
- Once the Plug-In is personalized, click the 'Next' button to continue.
- Check the 'Use License Card' box and press the 'Next' button (figure 2.3).



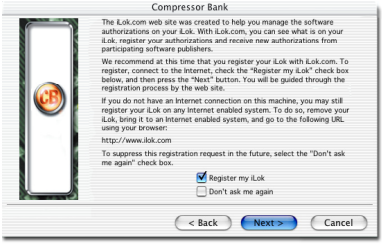
Note: Although the Authorization Wizard may appear to allow authorization by challenge/ response, that method is currently NOT SUPPORTED McDSP Plug-Ins.

- Separate the small punch-out iLok License Chip (the removable metal and plastic tab) from the License Card by pushing the cutout up and out with your thumb. Do not force your finger downward.

- The iLok License Chip may now be inserted into the 'key slot' of the iLok USB Smart Key (figure 2.6). If the iLok USB Smart Key does not appear to be present on the system, ensure the iLok USB Smart Key is connected to a valid USB port and that the green LED is lit inside the iLok USB Smart Key. To insert the License Chip into the iLok USB Smart Key, orient the iLok USB Smart Key's USB end to the left, and the loop end to the upper right. Insert the metal chip end of the iLok License Chip (the License Chip tab should have the metal chip side facing up towards you, not down). You should be able to visually verify that the License Chip makes contact with the iLok USB Smart Key metal card reader.



- The green LED in the iLok USB Smart Key will light when it is ready to receive and transmit data.
- Upon inserting the iLok License Chip, a message will be displayed indicating the authorization was installed successfully. Click 'Ok' in the message dialog.



- Once the authorization is installed on the iLok USB Smart Key, a dialog is displayed prompting the user to register their iLok USB Smart Key at the www.ilok.com website. The iLok.com website was created to allow users to manage the software authorizations on their iLok USB Smart Key. THIS STEP IS NOT REQUIRED TO COMPLETE THE AUTHORIZATION OF MCDSP SOFTWARE. The registration of the iLok USB Smart Key to an iLok.com account can be bypassed by clearing the checkbox. The user may also choose to not be asked to register again. While iLok.com is a great resource for the iLok USB Smart Key, your iLok USB Smart Key may only be linked to one iLok.com account. That is, an individual iLok USB Smart Key can only be registered to one account at a time--but a single account can have multiple iLok USB Smart Keys. If the iLok.com account information is lost, the iLok USB Smart Key cannot be registered to another account. However, an iLok USB Smart Key may be transferred between accounts if all the authorizations have been transferred off the iLok USB Smart Key. Register the iLok USB Smart Key to an iLok.com account only when you are ready to retain all the needed iLok.com account information (User ID and Password).
- A 'Finished' dialog is displayed showing what authorization method was used.
- Click 'Finish' to exit the Authorization Wizard.

Authorizing with iLok.com

Required for demo, upgrade, and replacement authorizations only

iLok.com can be accessed from any Macintosh or PC with an Internet connection. You can do this at home, a friend's, or at the office as long as there is an internet connection to access iLok.com--note that you don't have to use your ProTools system computer! You simply use this computer to connect to iLok.com and transfer authorizations to your iLok Smart Key. The iLok Smart Key can then be moved to your ProTools system to complete authorization of your Plug-In.

You will need:

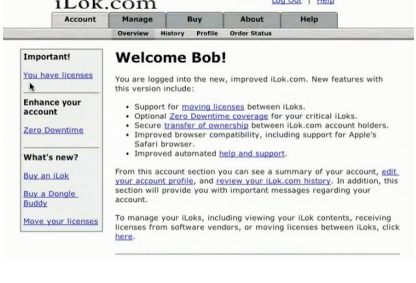
- A computer with an Internet connection. Either a Macintosh running OS 9.2 to OS 10.3 or a PC running Windows 98, ME, 2000, XP, or Vista
- An iLok USB Smart Key
- A valid iLok.com account. Visit www.iLok.com and set up a free account, if you have not already done so.

1) Download and install the required client software from iLok.com.

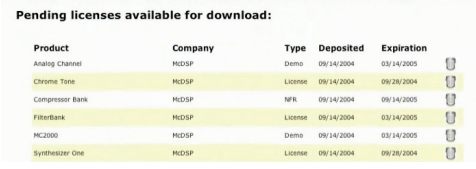
2) Download the desired McDSP Plug-In Installer from:
http://www.mcdsp.com/support/updating.html

3) To receive an upgrade or replacement authorization, send email your iLok.com account information to: support@mcdsp.com
To receive a demo authorization, email your iLok.com account information to: authorize@mcdsp.com

Insert your iLok Smart Key into an available USB port and ensure that the indicator light is lit. Once your demo, upgrade, or replacement authorization is available for transfer, your iLok.com account will display the notice saying "You have licenses" on the upper left. Begin by selecting that link.

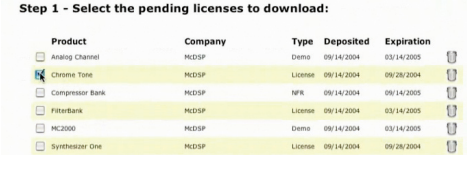


The next page will display the pending licenses available for download. This page will also display the name of the Plug-In, its manufacturer, the type of authorization (demo, Not For Resale, or License), the date the authorization was deposited, and the date when the authorization will no longer be available for download from the server.

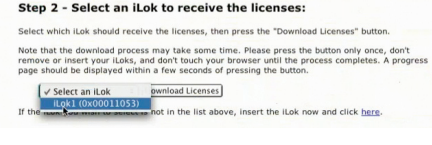


Before any transfer of authorizations can take place, you must synchonize your iLok Smart Key with iLok.com. This may take a moment to process depending on your internet connection.

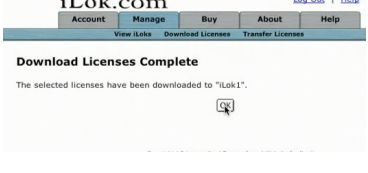
Once you have synchronized your iLok, you can select the authorization(s) you wish to transfer to your iLok.



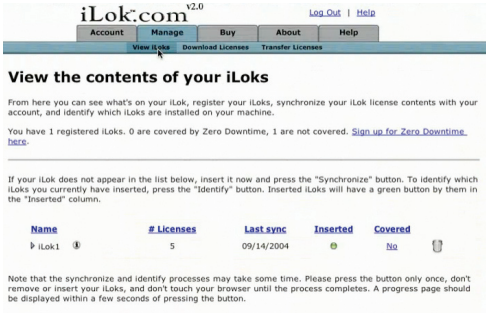
If you have multiple iLoks connected to your computer, it is important to select the correct iLok you wish the authorizations to be transferred to. Then click "Download Licenses" to begin the process. Again, this may take a moment depending on your internet connection.



When the transfer finishes you will be asked to confirm the completition of the transaction, thereby letting you know that the transfer was successful.



If you wish to go back into your account and visually confirm the transaction for yourself, select “View iLoks” Then select the iLok you had the authorizations transferred to.



That’s it! Dont forget to logout and move the iLok Smart Key to your ProTools System if you are using another computer for Internet access. Also, you may need to install a different version of the Plug-In if you are upgrading or replacing.

Transferring Authorizations with iLok.com

You may freely transfer any authorization within your iLok.com account between any of your registered iLok Smart Keys. If you wish to transfer an authorization out of your iLok.com account to a different user, it will require additional support from PACE Anti-Piracy, Inc and may be subject to a service fee or limited by manufacturer restrictions. Check the www.ilok.com website for updates and developments regarding iLok USB Smart Keys and the Pace Interlok Copy Protection system.

Registering your McDSP Plug-In

To register your McDSP Plug-In, fill out and return the product registration card enclosed with the boxed Plug-In package by mail or fax 707-220-0994. Registering your product entitles you to future upgrades and advance information from McDSP. Each individual product must be registered (even if you have multiple copies), and the product must be registered to an individual, not an entity. If you represent a company it is your company's responsibility to notify McDSP in writing if the individual who registered the Plug-In is no longer with the company. The Company must also be able to supply matching registration information to successfully transfer ownership of the Plug-In.

Using your McDSP Plug-Ins

Starting a McDSP Plug-In:

Follow the installation, authorization, and registration instructions above, Launch Pro Tools™, and the McDSP Plug-In and its presets are ready for use. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation such as automation.

Exiting a McDSP Plug-In

A McDSP Plug-In is exited by clicking on the desktop or other window in the DAE application running the Plug-In, closing the Plug-In window, or de-instantiating the Plug-In. Pro Tools™ sessions will save instantiated Plug-In configurations and their settings. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation.

MC2000

Congratulations on purchasing the MC2000 plug-in, the multi-band compressor from McDSP.

The MC2000 plug-in has the power and flexibility to emulate any other compressor or create custom compressors, in two, three, and four band configurations. Imagine a three-band stereo compressor with a dbx 165™ on the low-frequency band, a Neve 33609C™ on the mid-frequency band, and a Teletronix LA2A™ on the high-frequency band. These kinds of mind-boggling configurations which were previously impossible are now only presets away with the MC2000 plug-in. Add to that simultaneous access to each bands input/output metering, compression gain, final output level, crossover & compression curve displays, automation of every control, and McDSP's MC2000 becomes the obvious choice for the multi-band compressor of the new millennium.

Each compression band of the MC2000 uses the award winning McDSP CompressorBank algorithms and controls giving the user complete control of dynamic compression. Common controls such as Output (make-up gain), Threshold, Compression (Ratio), Attack, and Release are provided as well as non-standard Knee and Bite controls which allow the articulation of compression characteristics in unique and exciting ways. Multiple peak detection circuit types provide flexibility previously achieved only by owning different compression units.

The crossover sections in the MC2000 are steep 24 dB/oct filters, minimizing cross-talk between the compression bands. These filters are taken directly from McDSP FilterBank, the most highly regarded digital equalizer on the ProTools™ platform.

Feature List:

- Power and Flexibility: Six different multi-band compressor configurations are available –with two, three, and four band compressors, in both mono and stereo versions. Many of the MC2000 multi-band configurations can share the same DSP chip. See the Reference section for a complete listing of all MC2000 configurations and their specifications.
- Compression Curve Modeling: In addition to the standard Threshold and Compression (Ratio) controls, the actual shape and response of the compression curve can be adjusted with the Knee and Bite (Bi-directional Intelligent Transient Enhancement) controls. Knee can soften the compression curve creating a smoother response, and/or add pumping/ breathing compression effects. Unique and unprecedented Knee design allows the user to 'morph' between various compressor topologies such as the dbx 165™, Neve 2254E/33609™, and Teletronix LA2A™. Bite gives the compressor the ability to allow signal transients (rapidly changing signals – i.e. short bursts of high frequency data) to pass uncompressed, while the overall compression response is unchanged. These controls allow the user to emulate responses of their favorite vintage gear or create something completely new.
- Multiple Peak Detection Circuits: Every compressor uses a time constant circuit model to detect and track signal peaks and then apply dynamic compression. Variations of basic models are available in the MC2000: Type 1 - pure peak detection, Type 2 - pure peak detection combined with adaptive release times, and Auto - signal levels are automatically tracked.
- Double-Precision Arithmetic: at all stages of crossover and compression processing.
- MC2000 is compatible with ProTools and other DAW applications that support TDM, RTAS, and Audiosuite plug-in formats. The McDSP MC2000 plug-in operates on Mac OS X and Windows XP systems.
- Supports Digidesign's™ Command 8, ProControl, and Control | 24, and Mackie's ™ HUI external control surfaces.

Quick Start Tour: MC2000

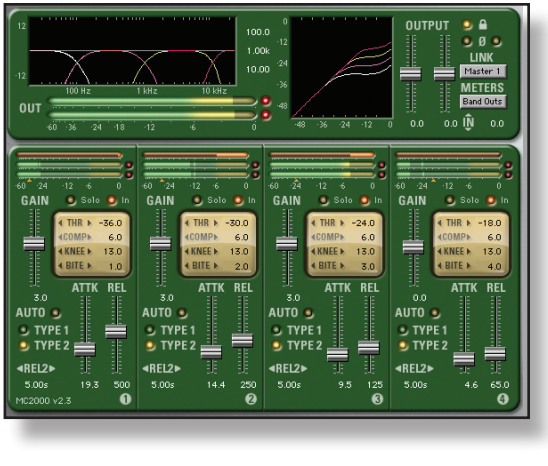
Start Protools ™ and Instantiate the MC2000 4-band configuration

- Launch Protools ™ and Open a Protools ™ Session.
- Verify the Display-> Mix Window Shows->Inserts View option is checked.
- In one of the inserts of a stereo master fader, select the MC2000 plug-in 4-band configuration, called the MC4. Note the MC2000 will operate on master or regular audio tracks in mono or stereo versions.
- If the insert selection does not show MC2000 plug-ins, verify that the MC2000 plug-in has been installed correctly.
- For more information on starting ProTools ™ and working with plug-ins, see Digidesign's ™ ProTools ™ Reference Guide

The MC2000 4-band Configuration Overview

All configurations (2 band, 3 band, and 4 band) of MC2000 feature the following:

- Each compression band is a full McDSP CompressorBank compressor with uniquely flexible Knee and Bite (Bi-directional Intelligent Transient Enhancement) controls, multiple Time-Constant (TC) circuit types, and the ability to emulate many compressor/ limiter classics.
- Any band can be configured as the master-band
- Metering of band compression gain, band input or output, and master output



Crossover Display:

Each band crossover shown in unique color matching color of band compression curve in Compression Display

Compressor (x4 in this example):

Threshold: 0 to -45 dB

Compression: 1:1 to 10:1

Knee: -10.0 to 15.0

0 = hard knee

-10 to 0 = undershoot

0 to 10 = overshoot

10 to 15 = overshoot w/comp 'tail'

Bite (Bi-directional Intelligent Transient Enhancement): 1.0 to 50.0 (50 = max Bite)

Band Solo and **In/Out** LED

Compression Gain

Input or Output metering with peak LED

TC Circuit:

Attack: 0.03 to 250 msec

Release: 5 msec to 2.5 sec

Release2: 5 msec to 5.0 sec

TC Circuit Types:

Auto - automatic attack and release

Type 1 - pure peak detection

Type 2 - adaptive release

Compression Display:

Each band compression curve shown in unique color matching color of band crossover in Crossover Display

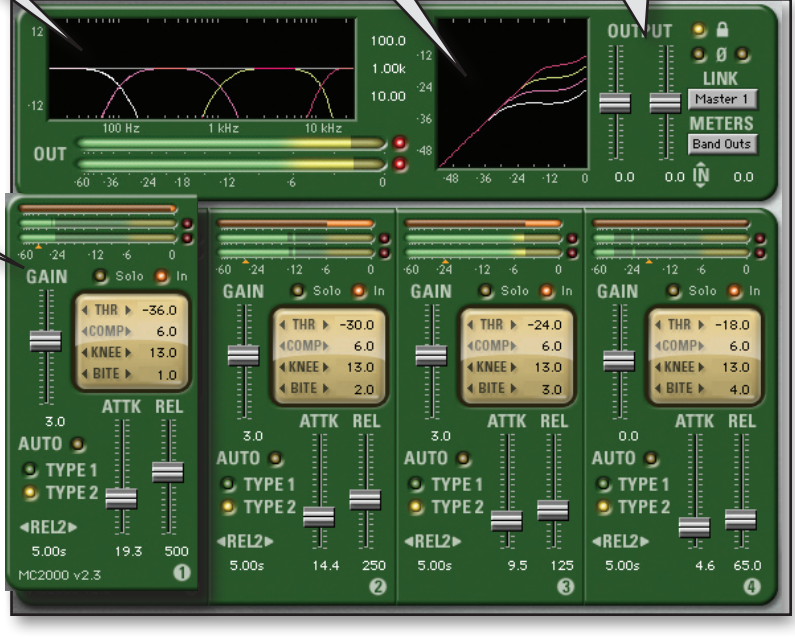
Mastering Section:

Output: +/- 24 dB with phase polarity switch

Input: +/- 12 dB (popup slider)

Link: Unlinked (off), or set with any band as the master band (as shown below, 'Master 1' setting indicates that band 1 is the master)

Meters: Select input or output metering for compression bands



To adjust any of the controls with sliders (including the pop-up sliders for Threshold (Thr), Compression Ratio (Comp), Knee, Bite in the band sections, and the Input (In) control in the master section - just click the control name), you can:

- Click and drag the sliders, or
- Hold the <command> key on OS X (or <Ctrl> key on Windows XP) while dragging the slider for fine control, or
- Click on the text box to highlight and edit the numeric value to get precise control (if a value outside the valid range is input, the control will default to the nearest allowed value when enter is hit) and hit <Enter>, or
- Click on the text box to highlight the numeric value and then use the arrow keys to increase or decrease the numeric value, or
- Use the <option> key on OS X (or <Alt> key on Windows XP) to bring all the controls to their default values, or
- Use hardware controller surfaces supported by the MC2000 including the Mackie HUI and Digidesign's ProControl ™.

The three different TC circuit types (Type-1, Type-2, and Auto) can be selected by clicking the LED buttons next to each TC Circuit type text.

Note the Auto control will override the TC type selection, as well as the attack and release controls.

The crossover points can be adjusted from the text boxes just to the right of the Crossover display, or by simply clicking the crossover points themselves on the graph! Holding the <command> key on OS X (or <Ctrl> key on Windows XP) while moving the crossover point will allow fine control.

The compression bands can be soloed using the yellow Solo LED, and engaged/bypassed (i.e. In or Out) using the orange In LED in the upper right of each section.

Control Linking

To link the Right and Left Output Controls of stereo versions:

- Enable the 'Lock' LED in the Master Section (lit is enabled, unlit is disabled). The Left and Right controls will be linked relative to their positions prior to enabling the 'Lock' LED. This allows both linked stereo operation and relative link operation.

- To link controls for stereo operation, set the left and right Input controls to equal values before enabling the 'Lock' LED. Adjust one of the Left controls and note how the corresponding right control automatically adjusts to be equal with the left control (for example, if you adjust the left gain to be equal to 6 dB, the right gain will equal 6 dB too), or
- To link controls for relative link operation, set the left and right Input controls to the desired offset from each other before enabling the 'Lock' LED. Adjust one of the left controls and note how the corresponding right control automatically adjusts relative to the left control (for example, if you adjust the left gain to increase by 2 dB, the right gain will increase by 2 dB. Unlike the stereo link operation, this type of linking will allow the left and right controls to have different values).
- To disable automatic linking, disable the 'Lock' LED.

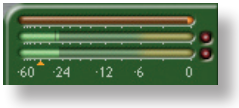
To link the compression bands:

- Select a compression band as the master band using the Link control in the Master section of the MC2000.
- All band controls, excluding the Auto and TC Type controls, will link relatively to the master band (for example, if you adjust the master band Threshold by +2 dB, the slaved bands will also change by +2 dB). Moving the controls of the slaved bands will not affect the other bands, nor the master band. The relative offsets are recalculated when a slaved band control is updated.
- The Auto and TC Type controls link absolutely to the master band when initially selected, but also allow customization of slave bands. For example, if the selected master band is using TC Type 2 (i.e. Auto mode is off) then all slave bands will also use TC Type 2. Should one of the slaved bands be updated to select Auto or TC Type 1 – that bands TC Type control NO LONGER LINKS TO THE MASTER BAND. Usually a control change of this nature is done to address compression requirements of the band, and so the update allows the control to remain independent of the master band.
- The Solo and In/Out band controls are not affected by the Link control status and operate independently of each other. The exception is when the Master Bypass control is engaged, causing all compression band In/Out controls to be set to 'Out' – ie bypassed.

A table listing all the control linking capabilities is provided in the reference section at the end of this manual.

The Meters

The MC2000 plug-in has metering for each compression band (compression gain and selectable input or output metering) and final output metering.



MC2000 compression band metering section

Each white hash mark represents a change of 3 dB; the top hash mark represents 0 dB. The input and output meters become bright green as signal is passed through the compressor, and become bright yellow as the input or output signal exceeds -6 dB in its respective meter. The Peak Meter lights when the signal is about to clip. The peak meters can be cleared by clicking them with the mouse. Clicking the master output peak LED while holding down the <option> key on OS X (or <Alt> key on Windows XP) will clear all the peak LED meters in the plug-in.

The compression gain meter is orange to distinguish it from the input and output meters. The amount of gain reduction is read from right to left, the meter increases in this direction as compression gain is applied to the input signal.

Note that when the output gain is 0 dB (unity) the input and compression gain meters can be added to equal the current output level in the output meter. This is a good way to develop an understanding of how compressors operate.

Along the bottom of the input/output meter is a threshold marker (orange triangle). As the input signal (shown in the input meter) exceeds the threshold, the compression gain meter begins to show dynamic range compression taking place.

Stereo versions of the MC2000 configurations have two input/output meters, but still only one compression gain meter in each band, and two master output meters. Stereo versions of the MC2000 base their compression gain on a composite signal derived from the current left and right input signal levels.

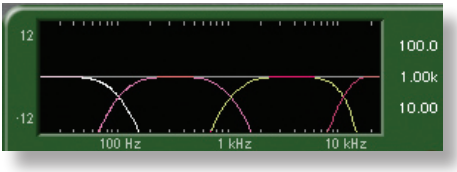
The Crossover and Compression Displays

The MC2000 plug-in provides important visual feedback to the user via its Crossover and Compression Displays. These UI components allow quick setup and confirmation of control settings.

Crossover Frequency Response Graph

The MC2000 plug-in breaks the input signal into separate frequency bands using a multi-band crossover. The MC2000 crossover sections' frequency

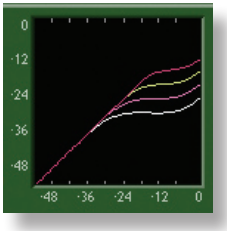
responses are shown in the Crossover Display. Additionally the crossover points themselves are adjustable from this display. By clicking and dragging the portion of the graph where band crossovers intersect, the user can update the crossover frequency value. Note how each band's color code is the same in the Compression Display. A frequency vs. dB grid can be displayed with the graph, by holding the <Control> key on OS X (or <Windows> key on Windows XP, which is the key between <Ctrl> and <Alt> on a PC keyboard) while clicking on the graph. Alternatively, you may right-click your mouse on the graph to display the grid on Windows XP. Repeating this action will remove the grid.



MC2000 Crossover Frequency Response Graph

Compression Curve Graph

The Compression Curve Graph shows the Input vs. Output response (in dB) of the compressor, as determined by the Threshold, Compression, and Knee controls of each compression band. Note how each band's color code is the same in the Crossover Display. A dB vs. dB grid can be displayed with the graph, by hold the <Control> key on OS X (or <Windows> key on Windows XP) while clicking on the graph. Repeating this action will remove the grid.



MC2000 Compression Display

Automation

All MC2000 controls are completely automatable. See the Digidesign™ ProTools™ Reference Guide, Automating plug-ins section. Here are a few tips about automating the MC2000 plug-in:

- If stereo or linked automation is desired for a left/right output control pair, the user only needs to automate ONE of the left/right control pair. The stereo or link offset is preserved during automation playback. Both left and right controls may be automated simultaneously, however the automation data is simply duplicated in the left and right control pair.
- If discrete automation is desired for a left/right control pair, then the Output control mode 'Lock' LED should be disabled. This will allow each left/right control to operate independently.

- If automation of all bands is desired, select a Master band only automate that band's controls. The Master will affect the slaved bands. This minimizes automation duplication and the processing overhead it creates.

Presets: Using the Presets and Making Your Own

The MC2000 presets are inspired by compressors such as the UREI 1176 LN™, Teletronix LA2A™, Neve 2254E/33609™, Avalon Designs 2044™, Empirical Labs EL8 Distressor™, dbx 165™, and Altec Lansing 9473A™. A variety of other presets are named for their application ('vocal', 'drums', 'guitar'). The presets can be accessed from the ProTools™ "plug-in Librarian" and "plug-in Settings" pop-up menus.

To make and save your own presets, see the "plug-in Librarian Functions" section of Digidesign™'s DigiRack plug-ins Guide.

A Word on Preset Compatibility

Presets for the 2, 3, and 4-band configurations of the MC2000 plug-in are interchangeable except with regard to the number of bands available. For example, a preset created with a 2-band configuration can be used in a 3 or 4-band configuration (mono and stereo). However, some of the controls in 3 or 4-band configurations are not available in the 2-band, because there are fewer bands. When a preset is saved, those bands not contained in that configuration will be set to default values.

If an incompatible preset is used, such as a McDSP FilterBank EQ preset, the MC2000 plug-in will display a warning message accompanied by a system beep and retain the control settings before the preset was applied

For more information, see Chapter 4: Using the MC2000 plug-in

Using the MC2000 Plug-In

A Closer Look at the MC2000 Compressors

The MC2000 compression bands are taken from the compression algorithms in the award winning McDSP CompressorBank plug-in. Each band has all the control and functionality of a CompressorBank CB1 configuration (mono or stereo). Never before has such control been available in a multi-band compressor.

Output/Gain Stage

All MC2000 compression bands come with an output/gain stage. When a signal is compressed, the maximum signal level is reduced. Compressors provide a 'make-up' gain to allow the signal level to be returned to its previous level (or other desirable level).

The 'make-up' gain control is useful in amplifying low level signal levels, such as room ambience, while the compressor reduces signal peaks that would have otherwise been masking such sounds.

Compressor

The compression sections of the MC2000 plug-in are comprised of 4 controls - Threshold, Compression, Knee, and Bite (Bi-directional Intelligent Transient Enhancement).

Threshold

The signal level above which the compressor is engaged. Audio below this level will not be compressed. Audio above this level will be compressed by the amount the signal is above the threshold level.

Compression

The amount of compression, also known as the compression ratio.

As audio exceeds the threshold level, it is compressed by an amount determined from this control. This is illustrated in the example below:

Example: Threshold = -12 dB

Compression = 4.0 (4:1 compression ratio)

Signal Level = 0 dB

The signal level is above the threshold by 12 dB. This amount is compressed at a ratio of 4:1, to 12 / 4 = 3 dB. The new compressed signal level is then -12 dB + 3 dB = -9 dB.

When a stereo compression configuration is used, the maximum of the left and right input channels is used as the compressor input.

Knee

The smoothing of the compression response immediately below and above the threshold level. The effect of the knee control is best understood by viewing the MC2000 plug-in Compression Display while adjusting the control.

The Knee control has three ranges of values - undershoot range is -10 to 0, overshoot range is 0 to +10, and overshoot with compression 'tail' is +10 to +15. The undershoot range creates a smoothed transition from unity gain (1:1 compression ratio) to the selected compression ratio. This effect emulates the trademarked 'over easy' compression curves of the dbx™ compressors. The overshoot range allows the compressor to 'miss', or 'overshoot' the desired compression ratio and ultimately recover to a linear compression curve. This effect creates pumping/breathing effects found in such compressors as the Neve 33609C™. The overshoot with 'tail' range continues the overshoot response, and adds a compression 'tail'. This 'tail' reduces compression ratios for signals that greatly exceed the compression threshold. Such an effect gives compressed signals more 'presence' or 'top-end' as some strong signal transients are allowed to pass with less gain reduction from the compressor. Such characteristics are common in devices like the Teletronix LA2A™ and other 'opto-compressors'.

It is important to note how these three variations of knee control transition smoothly from one to the other. New and unprecedented compression techniques are available only in the MC2000 plug-in. The user can choose different knee shapes, even changing compression paradigms (from a dbx 165™ to a Neve 33609™), in a single continuous control change. Consider these capabilities in a MULTI-BAND COMPRESSOR!

Bite

The Bi-directional Intelligent Transient Enhancement control gives the

compressor…well…more 'bite'. As this control is increased, fast signal changes (transients) are allowed to pass through the compressor while the overall compression amount is the same. The transients of a compressed signal will become more obvious as more 'bite' is applied. This control is useful in emulating the response of analog compressors.

Attack and Release

Compressors use a circuit to track the signal changes over time as they exceed the threshold control level. Such circuits have time constants (attack and release) to articulate the response of the circuit to signal changes (hence the term 'time constant' circuit, or TC circuit). These circuits, in conjunction with the compressor controls, shape the overall sound of the compressor. The MC2000 compressors are unique because they give the user multiple variations on these circuits. The Time-Constant (TC) Circuit section of each MC2000 compressor is comprised of 4 controls: Attack, Release, Release2, and TC Circuit Type.

Attack

The rate at which the compressor responds to signals as they rise above the threshold. A fast attack can track, even sample-by-sample, the changes in the signal data. Note that such a fast setting can introduce unwanted 'gain cogging' (in analog or digital domains!) as the compressor response sounds erratic as it changes with every signal nuance.

Release

The rate at which the compressor responds to signals as they fall back to and below the threshold level. A fast release can track, almost sample-by-sample, the changes in the signal data. Note that such a fast setting can introduce unwanted 'gain cogging' (in analog or digital domains!) as the compressor response sounds erratic as it changes with every signal nuance.

Release2

The secondary rate at which the compressor responds to signals as they fall back to and below the threshold level. This secondary release control is available only in the Type-2 TC circuit, and is used to 'fine tune' the overall release response. Note that when using Release and Release2 concurrently, the overall release time is faster than indicated by either release control. Setting Release2 to its maximum release time of 5.0 seconds makes its effect on the release response negligible.

TC Circuit Type

Selects the TC circuit algorithm - Type-1: Pure Peak Detection, Type-2: Adaptive Release, and Auto: Automatic attack and release based on signal data. Note when the Auto TC circuit type is selected, the Attack and Release (and Release2) controls have no effect.

Time Constant Circuits

The MC2000 compressors have two types of Time Constant (TC) circuit algorithms to emulate the TC circuit responses (and hence sound) of other compressors. There are two types of user controllable curves:

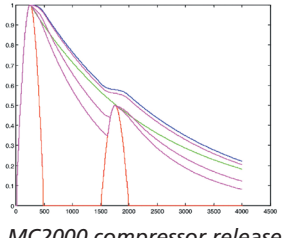
Type-1: Pure Peak Detection

The release response is unaffected by new signals if those signal levels are below the current release level.

Type-2: Adaptive Release

The release response is affected by new signal regardless of the signal level relative to the current release level.

The Release2 control allows further manipulation of the release response, and is available when using the Type-2 release curve. Because both Release and Release2 control operate independently and concurrently, care should be taken when operating both. If, for example, the Release2 response is decreased to an amount equal to the main Release control, the overall release will be even faster. For this reason, the default control value for Release2 is 5.0 seconds, which makes the control's effect on the release curve negligible.



MC2000 compressor release curves

Figure 4.1 shows the Type-1 (green) and Type-2 (blue), as well as the affect of decreasing the Release2 control (purple).

As shown in the Type-1 (green) line in Fig 4.1, a second signal spike (red) does not alter the release response. The green line continues to decay unaffected by the new signal information because the new signal level is below the release signal level. In the Type-2 (blue) line the new signal affects the release level, even though the new signal level is below the release level. The Type-2 w/ Release2 added (purple) line total release time becomes shorter as the Release2 control is increased. Note how this response can even produce release times faster than the original release as Release2 is equal to or less than Release.

A Closer Look at the MC2000 Crossover

The MC2000 crossover is comprised of steep 24 db/oct filter sections to minimize signal leakage into adjacent compression bands. These filters are taken directly from the award winning McDSP FilterBank plug-in design – 48 bit precision calculations and analog saturation modeling in every filter section.

Crossover Control

The MC2000 crossover can be control from the text displays just to the right of the Crossover Display, or from the display itself. To perform the later operation, simply click on the Crossover Display at the point where two adjacent crossover bands intersect. Mouse movement to the left or right (while holding the mouse button down, as with normal slider control) updates the crossover for the adjacent compression bands. Note the fine-control via the <command> key on OS X (or <Ctrl> key on Windows XP) is also available (as with normal slider control).

When a crossover point begins to overlap with other crossover points, those points are updated as well, preserving the 2, 3, or 4 distinct compression bands.

On Windows XP, a single right-click in the Crossover Display will cause a frequency vs. dB grid to appear in the Crossover Display. Clicking this area again clears the grid from the display.

A Closer Look at the MC2000 Master Section

The MC2000 master control section provides user control of the input and final output levels, phase polarity, band-linking, and band-metering display.

Input and Output

The MC2000 Input control ranges from –12 dB to +12 dB. The same input gain is applied to both left and right channels in stereo MC2000 plug-in configurations. This feature is primarily intended for post-production facilities that work with audio typically at the –20 dB level (a.k.a. the 'Dolby Level').

Note that the input stage does NOT have any saturation handling. The user should monitor the input levels in the band input meters of each compression band (see Compression Band Metering below). Should any peak LEDs light, the user should scale back the input level until the LEDs remain clear.

The MC2000 Output control ranges from –24 dB to +24 dB. The output stage follows the summing of the individual compression bands, and the master output meter's show the level of the audio after being processed by this final gain stage. Stereo versions of the MC2000 plug-in have link-able Output controls. The link status is enabled/disabled from the 'Lock' LED. The polarity, or phase, of the signal can be altered at this stage as well by enabling/disabling the 'Ø' LED. The phase of the signal is unaffected when the 'Ø' LED is off.

Compression Band Linking

Any of the MC2000 plug-in compression bands can act as a master band, controlling that band and the other bands slaved to it. Using the Link control, a master section can be selected (Master 1, 2, 3, 4, or Unlinked). Quick control setup, expedited edits, and new creative compression techniques are possible using the compression band Link control.

The MC2000 plug-in compression band linking has the following operation characteristics:

- All band controls, excluding the Auto and TC Type controls, will link relatively to the master band (for example, if you adjust the master band Threshold by +2 dB, the slaved bands will also change by +2 dB). Moving the controls of the slaved bands will not affect the other bands, or the master band. The relative offsets are recalculated when a slaved band control is updated.
- The Attack, Release, and Release2 controls link relatively to each other, however the difference in time between linked control varies with the

master control value. This is due to the unique control scaling in the MC2000 time values of the Attack, Release, and Release2 controls. While the user is provided a significant amount of control in the extremely fast ranges of attack and release times with this scaling, fixed relative control offsets are not possible.

- The Auto and TC Type controls link absolutely to the master band (for example, if the master band has Auto off, and is using TC Type 2, then all slave bands will do so as well). Should a slaved band Auto or TC Type control be updated – that Auto or TC Type control NO LONGER LINKS TO THE MASTER BAND. Usually a control change of this nature is done to address compression requirements of the band, and so the update allows the control to remain independent of the master band.
- The Solo and In/Out band controls are not affected by the Link control status and operate independently of each other. The exception is when the Master Bypass control is engaged, causing all compression band In/Out controls to be set to 'Out' – i.e. bypassed.

Modeling Analog Compressors with the MC2000

The MC2000 plug-in uses the compression algorithms from the McDSP CompressorBank plug-in. Thus the MC2000 plug-in can model a wide variety of vintage and contemporary compressor implementations – IN MULTI-BAND CONFIGURATIONS. Imagine a dbx 165™ on the lows, a Neve 33609C™ on the mids, and a Teletronix LA2A™ on the highs! Such configurations would not have been attainable otherwise.

This section highlights how the McDSP CompressorBank plug-in features contained in MC2000 are used to model some of these analog implementations. The user is additionally directed to various presets included in the MC2000 plug-in package.

Each of the following sections contains graphs representing the responses of analog gear, as measured by the engineering staff at McDSP. Although the names of other compressor manufacturers are mentioned in this chapter, they are in no way affiliated with McDSP.

The MC2000 plug-in presets are inspired by compressors such as the Urei 1176 LN™, Teletronix LA2A™, dbx 165™, Neve 33609C™, Avalon Designs 2044™, Empirical Labs EL8 Distressor™, and Altec Lansing 9473A™. The presets can be accessed from the ProTools™ "plug-in Librarian" and "plug-in Settings" pop-up menus.

To make and save your own presets, see the "plug-in Librarian Functions" section of Digidesign™'s DigiRack plug-ins Guide.

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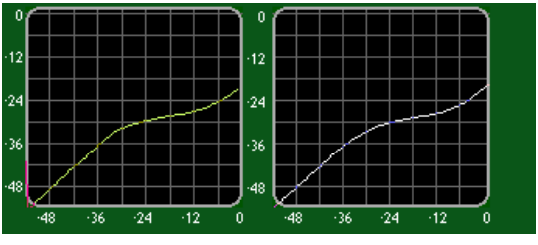
While MC2000 emulates the sounds of these compressors, McDSP makes no representation or warranty that the MC2000 is identical to or duplicates these compressors.

Teletronix LA2A™

Made first in Sunnyvale CA (not far from McDSP headquarters), this peak limiter has become one of the most sought after devices in music production. The LA2A, as well as other pure class A opto-compressors, are characterized by their soft knee and compression 'tail'. This gives the compression response more 'presence' in the mix as the amount of compression actually decreases when

enough signal is driven into it to reach the 'tail'.

The MC2000's Knee control range of +10 to +15 is designed specifically to emulate the LA2A and other contemporary opto-compressors. At a Knee of +10, the transition from 1:1 to X:1 compression is already very large. As the Knee control is increased to +15, the compression 'tail' is created.

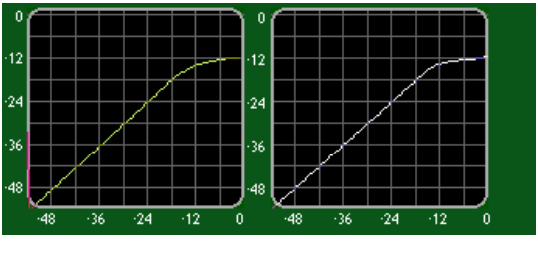


Teletronix LA2A (left) and the MC2000 (right)

The compression 'tail' is seen in Fig 4.4 between -12 dB and 0 dB. McDSP engineering also had the opportunity to evaluate an LA2A with the compressor/limiter switch modification, and the LA3A. These measurements, and the ones in Fig 4.4 above were used to create the 'LA too, eh?' presets.

UREI 1176 LN™ (blackface)

The UREI 1176 LN (1176 for short) was one of the first classic compressors to offer user adjustable attack, release, and compression ratio controls. Alleged to be superior to later production models, the 'blackface' front panel version is the 1176 edition measured by McDSP engineering.



UREI 1176 LN blackface (left) and the MC2000 (right)

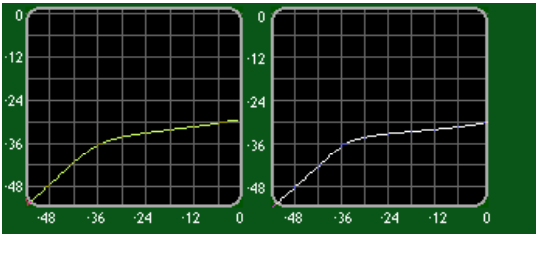
The MC2000's Knee control range of 0 to +10 models the 1176 knee shape nicely. The possible compression ratios of 4, 8, 12, 20, and '44' have been measured and transformed into MC2000 presets called 'blackface'.

The modeling of the 1176 also shows how the MC2000 compression bands can be setup to have a compression ratio much greater than its apparent 10:1 maximum. By using the Knee control (0 to +10) and Compression control interactively, a flat compression curve can be created easily. These controls, combined with the fastest attack setting (0.03 msec, i.e. one sample) make for a great brick wall limiter.

Neve 2254E/33609™

Originally part of larger Neve consoles, the 2254E compressor/limiter was made into a two channel stand-alone unit called the 33609C. The 33609 unit was evaluated at McDSP. Measured compression and limiter curves showed how the 33609 has the potential to create classic pumping/breathing effects due to a subtle overshoot in the compression knee.

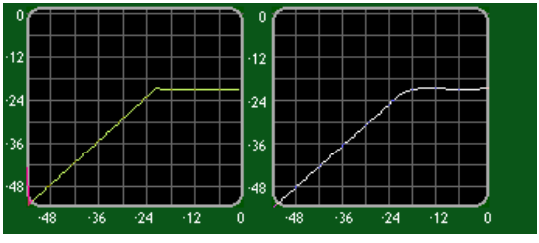
Using the Knee control (0 to +10 values), the MC2000 models this behavior very closely. In fact, this part of the MC2000 knee curve was designed to specifically emulate the 33609 compression response.



Neve 33609 (left) and the MC2000 (right) at 6:1 compression

Note how the overshoot portion of the MC2000's Knee control can create a knee size less than, equal to, or greater than the 33609. This is a good demonstration of the modeling accuracy and flexibility of the MC2000 compression bands.

The 33609 limiter has a similar knee overshoot characteristic as its compressor. Use of the Knee control can setup the MC2000 compression bands to function as a brick-wall limiter, as shown below in the emulation of the 33609.



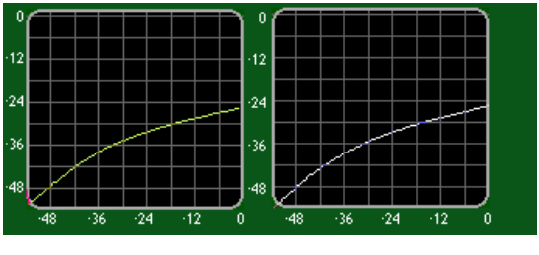
Neve 33609 Limiter (left) and the MC2000 (right) limiter emulation

Using the MC2000's Knee control to create an overshoot realizes a compression curve with a nearly flat, or brick-wall response. The smooth transition (seen in Fig 4.2 between -24 dB and -18 dB) makes the limiting as transparent as possible. Again the flexibility of the MC2000 compression bands provides another useful dynamic range control application.

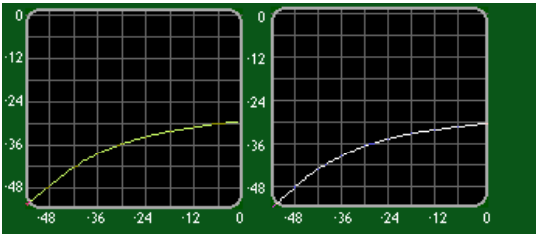
Presets in the MC2000 plug-in package derived from these models are called 'British Comp' and 'British Limiter'.

dbx 165™

The dbx 165, like other dbx compressors, is known for its 'over easy' trademarked compression sound. Using the MC2000's Knee control (-10 to 0) captures this characteristic very well.



dbx165 (left) and the MC2000 (right) at 4:1 compression



dbx165 (left) and the MC2000 (right) at 6:1 compression

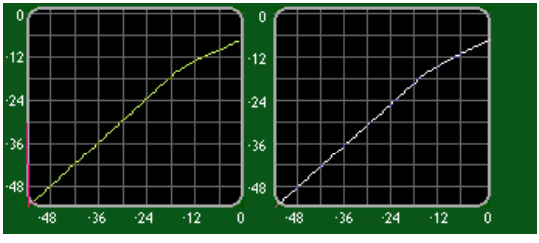
The transition from an un-compressed sound (1:1) to the selected compression ratio (4:1 and 6:1 above) is very gradual, to the point of obscuring the compressor threshold. Such a response allows the compressor to be transparent, even when applying a significant amount of compression.

Additional emulation of the dbx 165 is accomplished by using the MC2000's Bite control. Instead of manipulating the MC2000's attack control, the Bite control was used instead to approximate the corresponding dbx 165 attack control. The Attack control can be set anywhere from 10 to 50 msec during such operation.

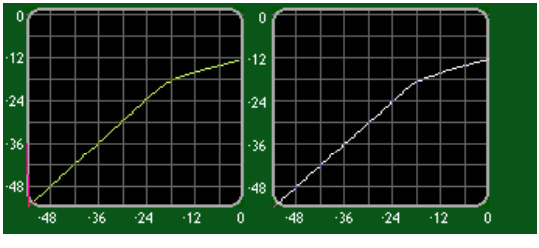
Presets in the MC2000 plug-in package derived from these models are called 'Old Smoothie'.

Avalon Designs AD2044™

Avalon Designs specializes in contemporary implementations of high-end audio gear emulating the sounds of classics of earlier eras. The AD2044 is a Pure Class A Opto-Compressor. The AD2044 compressor is very smooth and nearly transparent with few characteristics imparted into the audio. The transition from 1:1 compression to X:1 compression is achieved by a medium knee and moderate attack and release settings.

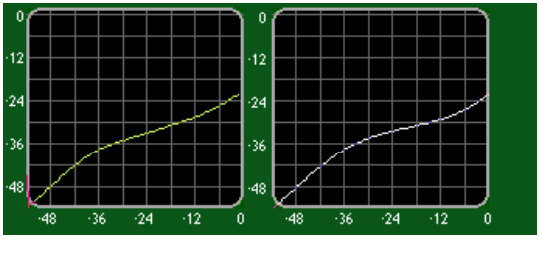


AD2044 (left) and the MC2000 (right) at 2:1 compression



AD2044 (left) and the MC2000 (right) at 5:1 compression

Lowering the threshold of the AD2044 reveals the same type of compressor 'tail' as found in the Teletronix LA2A.



AD2044 (left) and the MC2000 (right) w/ 'tail'

MC2000 plug-in presets derived from these models are titled 'Class A Opto xx'.

Other MC2000 Presets

Several other presets have been included in your MC2000 plug-in package. These settings were created to highlight the flexibility and utility of MC2000 plug-in. Many of the MC2000 presets have been highlighted here, named for the gear they emulate. Other application specific presets are given names such that their use is easily understood, such as 'vocal', 'dialog', 'drums', etc.

The MC2000 plug-in is the most flexible multi-band compressor on the planet. We hope you enjoy using it as much as we did creating it!

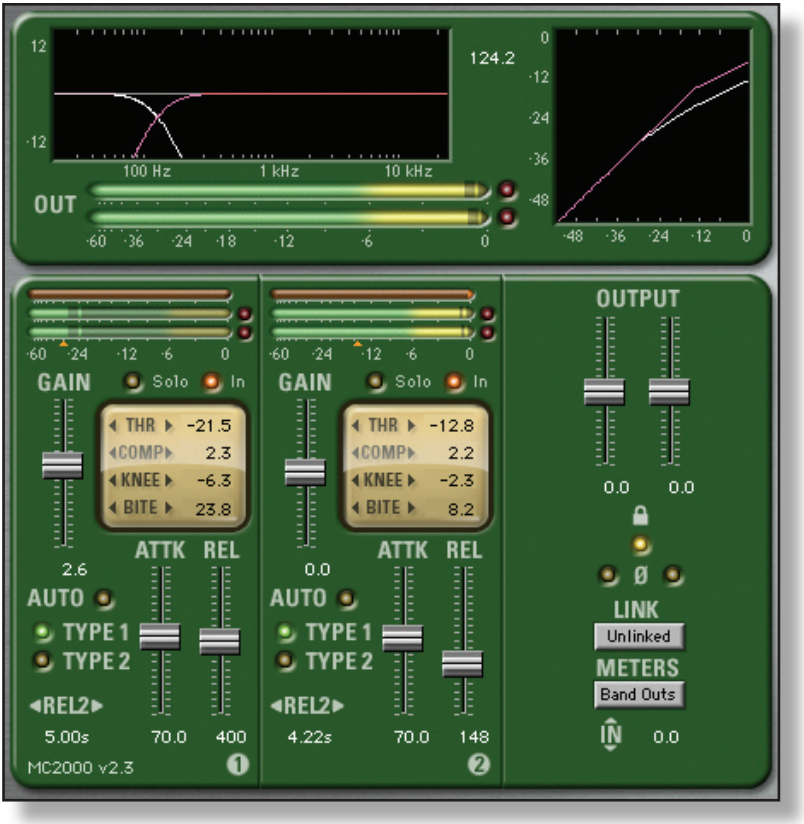
MC2000 Plug-In Reference Guide

MC2000 Specifications

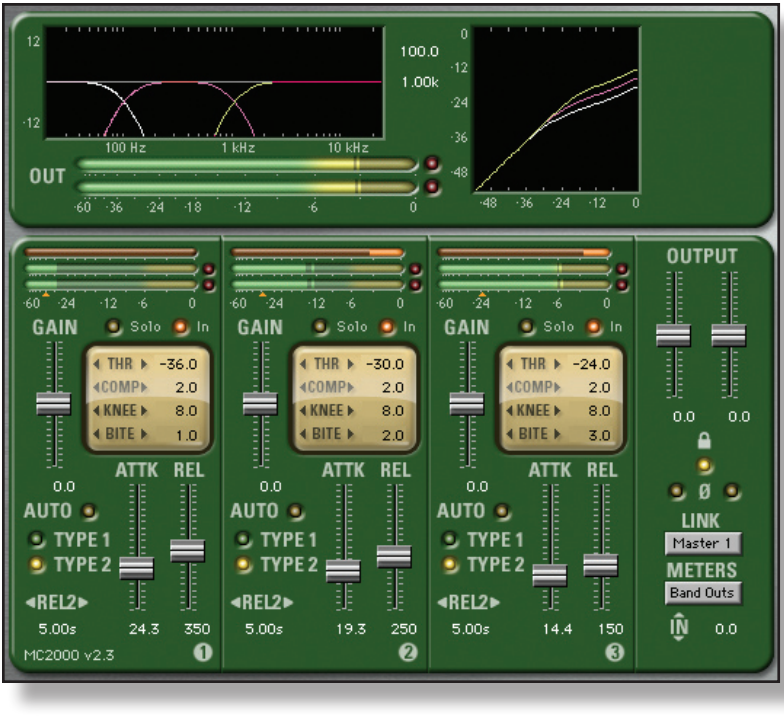
Parameter	Settings	Function
COMPRESSOR (ONE PER BAND)		
COMPRESSION GAIN METER	0 to 60 dB	Amount of Compression applied to band. The top meter in each band (above OUTPUT METER), displayed in orange and reading from right to left.
INPUT OR OUTPUT METERS	-60 to 0 dB	Output level of band. Meters below COMPRESSION GAIN METER, displayed in green and reading from left to right. Red LED's are lit to indicate output has clipped. Click LED to clear. Selected in the Master Section "METERS"
GAIN	-24 to +24 dB	Amount of make-up gain applied to band after the signal is compressed.
SOLO	ON/OFF	Solos the band. Yellow LED is lit when band is soloed. Note that multiple bands may be soloed at once.
IN	ON/OFF	Compressor enable/disable. Red LED is lit when band is enabled.
THRESHOLD	- 45 to 0 dB	Level at which the compresson starts. Also indicated by orange triangle on OUTPUT METER.
COMPRESSION	1:1 to 10:1	Ratio of input to output levels for compressor. As input exceeds the THRESHOLD, it is compressed by an amount determined by this control.
KNEE	-10.0 to 15.0	The smoothing of the compression response immediately below and above the threshold level. See COMPRESSION DISPLAY for visual display of differences. -10 to 0 = undershoot 0 = hard knee 0 to 10 = overshoot 10 to 15 = overshoot with compressor 'tail'
BITE	1.0 to 50.0	Bi-Directional Intelligent Transient Enhancement. As this control is increased, fast signal changes (transients) are allowed to pass through the compressor while the overall compression remains the same.
ATTACK	0.03 to 250 msec	The rate at which the compressor responds to signals as they rise above the THRESHOLD.
RELEASE	5 to 2.5 sec	The rate at which the compressor stops responding to signals as they fall below the THRESHOLD.

Parameter	Settings	Function
AUTO	ON/OFF	Automatic ATTACK and RELEASE. When AUTO mode is enabled, Yellow LED is lit and ATTACK, RELEASE, and RELEASE2 controls are disabled.
TYPE	Type-1, Type-2	Time Constant Circuit Type. Type-1 indicates the standard pure peak detection and Type-2 indicates a more advanced adaptive release based on multiple signal peaks.
RELEASE2	0.005 to 5.0 sec	The secondary rate at which the compressor stops responding to signals as they fall below the THRESHOLD. Only active when Type-2 TC CIRCUIT TYPE is selected.
MASTER SECTION		
MASTER OUTPUT METERS	-60 to 0 dB	Displays plug-in output level. Red LED's are lit to indicate output has clipped. Click LED to clear.
OUTPUT	-24 to +24 dB	Amount of make-up gain applied to master signal.
LOCK	ON/OFF	Locks right and left OUTPUT controls (stereo configurations only)
Ø (PHASE)	ON/OFF	Polarity (phase) of the final output. When yellow LED is lit, signal is 180 degrees out of phase from the original
LINK	Unlinked, Master 1, Master2	Selects Master band which can control settings across all individual bands. When Unlinked, each band is controlled individually. When a master is selected, moving a control in master band affects the corresponding control in slave bands accordingly. NOTE: SOLO and BAND IN/OUT are not linkable.
METERS	Band Ins, Band Outs	Selects the source for the OUTPUT METER display in the individual bands. When Band Ins is selected, each bands inputs are displayed in the OUTPUT METER. Note that the MASTER OUTPUT METERS always displays the output.
IN (INPUT)	-12 to +12 dB	Amount of gain applied to input signal before processing by bands.
CROSSOVER DISPLAY		
FILTERING	24 dB/oct filters	Depending on configuration, there are 2, 3, or 4 crossover filters - one for each band of compression.
CROSSOVER POINTS	20 to 20,000 Hz Frequency Plot	Crossover between adjacent frequency bands. Adjust by clicking crossover point on display or entering values in the text box to the right of Crossover Display.
COMPRESSION DISPLAY		
COMPRESSION DISPLAY	Input vs Output Plot	Displays each bands compression characteristics as determined by THRESHOLD and KNEE controls.
NUMBER OF BANDS		
MC2 Configuration		Two Bands
MC3 Configuration		Three Bands
MC4 Configuration		Four Bands

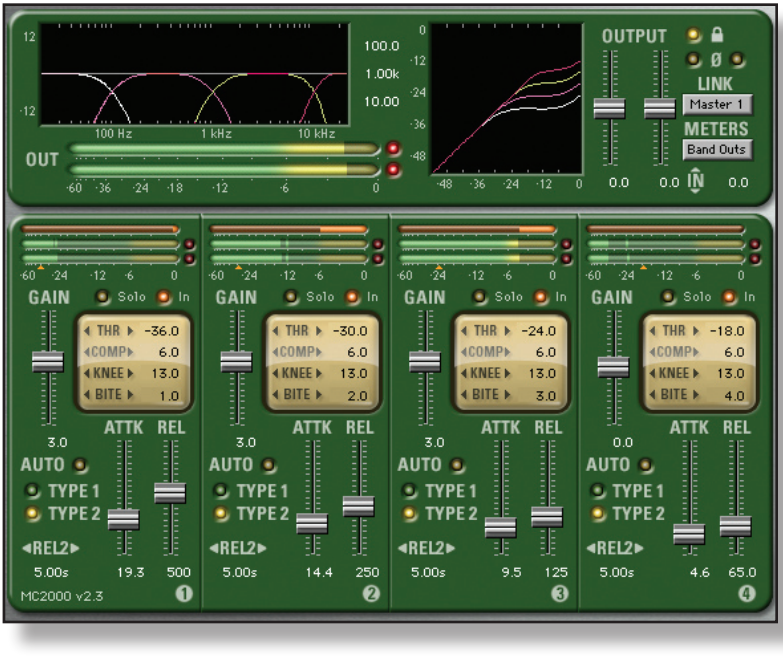
MC2000 2-Band Mono & Stereo (MC2)



MC2000 3-Band Mono & Stereo (MC3)



MC2000 4-Band Mono & Stereo (MC4)



Linked Control Table

The MC2000 plug-in provides a variety of linked control functionality in its many configurations. The table below lists all the linking capabilities of the MC2000 plug-in. For more information on control linking, see the Control Linking section of the Quick Start Tour.

Linked Controls	Link Action	Link Type
Left/Right Output controls	Enable the 'Lock' LED in the Master section.	Absolute or Relative
Compression band Gain, Threshold (Thr), Compression Ratio (Comp), Knee, Bite, Attack, Release, Release2	Enable master band by selecting a master band from the Link control	Relative
Compression band Time Circuit (TC) type, Auto TC type NOTE: These controls will stop responding to the master band once altered from the master band's TC Type or Auto control values	Enable master band by selecting a master band from the Link control in the Master section.	Absolute

DSP Delay

The delay incurred by on HD systems is 1 (ONE) sample. There is still a two sample delay from the TDM connection to the MC2000 plug-in. (This is the absolute minimum number of delay samples a TDM plug-in can have.) The McDSP plug-ins are designed in this manner to provide the user with the closest analog mixing console experience possible (since analog inserts such as EQ and compression do not cause a processing delay when inserted into a track).

DSP Usage

HD and HD Accel DSP hardware

The TDM versions of the MC2000 plug-in configurations use a varying amount of DSP resources for each MC2000 configuration. The table below is a listing of these DSP usages. The DSP Allocator utility provided by Digidesign ™ (or the DSP Usage display in ProTools ™ for ProTools version 5.0 and later) may be used to display DSP resource allocation when ProTools ™ is running.

Maximum Instantiation Counts at 44100

Configuration	# Instantiations per DSP on HD systems	# Instantiations per DSP on HD Accel systems
MC2 (mono)	5	10
MC2 (stereo)	3	6
MC3 (mono)	3	6
MC3 (stereo)	2	4
MC4 (mono)	2	4
MC4 (stereo)	1	2

Many of the MC2000 plug-in configurations can operate on the same DSP, depending on the configuration's DSP requirements. See below for the percentages of a HD or HD Accel DSP used by a single instantiation of a MC2000 plug-in:

Percentage of DSP used by one instantiation at 44100

Configuration	% of DSP used on HD systems	% of DSP used on HD Accel systems
MC2 (mono)	19%	10%
MC2 (stereo)	30%	15%
MC3 (mono)	30%	15%
MC3 (stereo)	48%	24%
MC4 (mono)	40%	20%
MC4 (stereo)	65%	33%

Using the data provided in the above chart, the MC2 (stereo) and MC4 (stereo) plug-in configurations can share the same DSP. Many other combinations exist, with the plug-in automatically making as efficient use of the DSPs available on a given system.

The MC2000 supports all higher sample rates (96 kHz and 192 kHz). However due to the DSP usage of some of the larger MC2000 configurations, not all configurations are available at the higher sample rates. For 96 kHz operation the DSP usage is doubled (x 2), and for 192 kHz operation, the DSP usage is quadrupled (x 4).

ProTools|24, Nubus, and MIX DSP hardware

The processing requirements of the MC2000 plug-in exceed the capacity of the ProTools|24 (Classic DSP Farm) and Nubus DSP hardware. While McDSP recognizes the significant population of ProTools users who operate on these hardware cards, the MC2000 is too large an algorithm to be supported on the ProTools|24 and Nubus hardware. MIX hardware support has been dropped as of version 3.3.1

MC2000 Frequently Asked Questions

For an updated list of Frequently Asked Questions, see our website:

www.mcdsp.com/FAQ.html.

How is the MC2000 plug-in different from other multi-band compressors?

The MC2000 plug-in gives you the most power and flexibility to emulate any other compressor (and many limiters) or create your own custom compressor/limiter, in a variety of multi-band configurations.

- Consider first the number of configurations you get in this one plug-in: two, three, and four band configurations - all in stereo and mono versions.
- Consider next, the maximum number and ranges of the independent controls available to the user to define the compression response curve. Our design philosophy is maximum user control, and here is the proof of our concept:
    - Standard compression controls - compression (ratio), threshold, and output (make-up gain) - allow only the most basic manipulation of the compression response.
    - Non-standard compression controls - Knee and Bite - give the user complete control over the articulation of the compression curve. The Knee control recreates the compression curves of many classic compressors, while giving the user the ability to morph between these compressor types. The Bite (Bi-directional Intelligent Transient Enhancement), control gives our compressor the ability to pass fast signal changes (transients) while maintaining the overall compression level. Both these controls are critical in the control of the over-all compression response, and allow the MC2000 plug-in to emulate other vintage and modern compressors.
    - Total UI feedback is readily apparent in the Crossover and Compression Curve Displays.

- The MC2000 plug-in is a high-end multi-band compressor with:
    - Double Precision Arithmetic which keeps the noise floor at -138dB. In contrast, it is possible for single precision arithmetic processors to raise the noise floor significantly above -138 dB.
    - Analog Saturation Modeling in the crossover sections prevent digital clip, and
    - The ability to model nearly every compressor/limiter 'classic', incorporating their processing characteristics into a variety of multi-band configurations.

Would you expect any less from the company founded by Colin McDowell, the mind responsible for FilterBank and CompressorBank?

What is Double Precision Arithmetic and why it is important?

The TDM bus is a 24 bit audio-signal path with a dynamic range of 138 dB. The MC2000 plug-in's internal double precision (48 bits) keeps the noise floor of its outputted signal at -138 dB. In contrast, with single precision (24 bit) arithmetic, the noise floor of a digital effect process can be dramatically higher than the -138 dB noise floor you would expect from a 24 bit data path. Such adverse affects would be seen as DC offset in output meters, even when there was no audio being processed. Small amounts of such noise reduce the quality of 24 bit audio data.

What is Analog Saturation Modeling and why you want it?

Analog Saturation Modeling prevents pure digital clip that can ruin a mix. Instead, analog saturation modeling will approximate the sound of an analog box driven to a clipping state.

What MC2000 plug-in presets are available?

Presets emulating a number of popular compressor sounds are included with the MC2000 plug-in, and are found in the 'Presets' folder in the MC2000 plug-in package. These presets were created from measurements taken at McDSP headquarters while emulating different analog/classic compressors. Other presets are included from industry professionals.

www.mcdsp.com