



*McDOWELL SIGNAL PROCESSING, LLC*

---

# **McDSP MC2000 Plug-in Manual**

---

## **McDSP McDowell Signal Processing, LLC**

1300 Crittenden Lane #401

Mountain View, CA 94043

Support

Email: [info@mc dsp.com](mailto:info@mc dsp.com)

Technical Support: [help@mc dsp.com](mailto:help@mc dsp.com)

World Wide Web: [www.mcdsp.com](http://www.mcdsp.com)

***Special Thanks to:***

- Daniel Caccavo, Will Catterson, Mikail Graham, Andy Gray, Jonathan Goldstein, Rhett Lawrence, and Dave Pensado, and the rest of our great beta team for their invaluable input and feedback
- Dr. Robert E. Filman and Tom McTavish for the tech-talk and encouragement
- Florian Richter, Ken Walden, and the many other 'tape sat' solicitors
- Frank Filipanits, Jr. for the GeneratorX plug-in his additional assistance with the abundance of details in bringing a software product to market
- David Denny and Stephen Jarvis for the rental on the great gear
- Rob Barrett, Jr. our #1 customer

from the entire McDSP development team.

***Copyright Notice:***

Copyright 1998-2010 McDowell Signal Processing, Limited Liability Company

All Rights Reserved. The McDowell Signal Processing, Limited Liability Company's MC2000 Plug-In and corresponding User's Manual is copyrighted and all rights are reserved. Information in this document is subject to change without notice and does not represent a commitment on the part of McDowell Signal Processing, Limited Liability Company. This document may not, in whole or part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form for the purpose of resale without prior consent, in writing, from McDowell Signal Processing, Limited Liability Company.

***Trademarks:***

McDowell Signal Processing, Limited Liability Company is a trademark of McDowell Signal Processing, Limited Liability Company.

*Avid™, Digidesign™ and Pro Tools™ are registered trademarks of Avid Technology, Inc.*

*Digital Performer, Mark of the Unicorn, and MOTU are registered trademarks of Mark of the Unicorn, Inc.*

*Logic, Logic Sutdown, and Apple are registered trademarks of Apple Computer, Inc.*

*The Audio Units logo is a trademark of Apple Computer, Inc.*

*Ableton, Ableton Live, Operator and Sampler are trademarks of Ableton AG.*

*Windows, and Windows XP are registered trademarks of Microsoft Corporation.*

*Intel is a registered trademark of Intel Corporation.*

All other product and company names are trademarks or registered trademarks of their respective holders.

# Table of Contents

---

<b>McDSP MC2000 Plug-in Manual</b>	<b>ii</b>
McDSP License Agreement	vi
<b><i>Getting Started with MC2000</i></b>	<b><i>viii</i></b>
System Requirements	viii
Installing the MC2000 Plug-in	x
Installation on Mac OS X	x
Installation on Windows XP and Vista	xi
Installation on VENUE D-SHOW systems	xii
Authorizing your McDSP Plug-ins	xiv
Authorizing with a pre-programmed iLok Smart Key	xiv
Authorizing with an iLok License Card	xiv
Authorizing with iLok.com	xviii
Registering your McDSP Plug-in	xxi
Using your McDSP Plug-ins	xxi

---

<b>MC2000</b>	<b>1</b>
<b><i>The Quick Start Tour: The MC2000 Plug-in</i></b>	<b><i>3</i></b>
MC2000 Overview	3
Crossover Display:	4
Compressor (x4 in this example):	4
Compression Display:	4
Master Section:	4
Controls	5
Master Section	5
Compressor	5
Time Constant Circuit	5
Displays	6
Metering Section	6
Cross Over Display	7
Crossover Frequency Response Graph	7
Compression Display	7

General Information	8
Control Linking	8
Automation	8
Presets: Using the Presets and Making Your Own	8

## ***Using the MC2000 Plug-in*** **10**

Basics	10
Compression	10
A Closer Look at the MC2000 Compressors	11
Output/Gain Stage	11
Compressor	11
Attack and Release	13
Time Constant Circuits	13
A Closer Look at the MC2000 Crossover	14
Crossover Control	14
A Closer Look at the MC2000 Master Section	15
Input and Output	15
Compression Band Linking	15
A Closer Look	17
Modeling Analog Compressors with the MC2000	17
Teletronix LA2A™	17
UREI 1176 LN™ (blackface)	18
Neve 2254E/33609™	19
dbx 165™	20
Avalon Designs AD2044™	21
Other MC2000 Presets	23

## ***MC2000 Plug-in Reference Guide*** **24**

MC2000 Specifications	24
Linked Control Table	26
DSP Delay	26
DSP Usage	26
Pro Tools™ HD and HD Accel DSP hardware	26
Maximum Instantiation Counts at 44100	27
Percentage of DSP used by one instantiation at 44100	27

---

## McDSP License Agreement

The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

### ***McDowell Signal Processing, Limited Liability Company License and Warranty:***

The software which accompanies this license (the "Software") is the property of McDowell Signal Processing, Limited Liability Company or its licensors and is protected by copyright law. While McDowell Signal Processing, Limited Liability Company continues to own the Software, you will have certain rights to use the Software after your acceptance of this license. Except as may be modified by a license addendum which accompanies this license, your rights and obligations with respect to the use of this Software are as follows:

#### ***You May:***

- authorize 1 (one) copy of the Software on 1 (one) PACE Anti-Piracy iLok USB Smart Key, for use with no more than 1 (one) computer at any given time;
- make copies of the Software for archival purposes, or copy the software onto the hard disk of your computer and retain the original for archival purposes;
- after written notice to McDowell Signal Processing, Limited Liability Company, transfer the Software on a permanent basis to another person or entity, provided that you retain no copies of the Software and the transferee agrees to the terms of this agreement

#### ***You may not:***

- copy, duplicate, or reproduce the documentation which accompanies the Software for the purpose of resale;
- sublicense, rent or lease any portion of the Software to a third party without expressed written permission from McDowell Signal Processing, LLC;
- reverse engineer, de-compile, disassemble, modify, translate, make any attempt to discover the source code of the Software, or create derivative works from the Software;
- make any attempt to circumvent any copy protection software;
- use a previous version or copy of the Software after you have received a replacement set or an upgraded version as a replacement of the prior version, unless you donate a previous version of an upgraded version to a charity of your choice, and such charity agrees in writing that it will be the sole end user of the product, and that it will abide by the terms of this agreement. Unless you so donate a previous version of an upgraded version, upon upgrading the Software, all copies of the prior version must be destroyed.

### ***Limited Warranty:***

McDowell Signal Processing, Limited Liability Company warrants that the media on which the Software is distributed will be free from defects. Your sole remedy in the event of a breach of this warranty will be that McDowell Signal Processing, Limited Liability Company will, at its option, replace any defective media. McDowell Signal Processing, Limited Liability Company does not warrant that the Software will meet your requirements or that the operation of the Software will be uninterrupted or that the Software will be error-free. THE ABOVE WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON INFRINGEMENT. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

### ***Disclaimer of Damages:***

REGARDLESS OF WHETHER ANY REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT WILL McDowell Signal Processing, Limited Liability Company BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR SIMILAR DAMAGES, INCLUDING ANY LOST PROFITS OR LOST DATA ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE EVEN IF McDowell Signal Processing, Limited Liability Company HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. IN NO CASE SHALL McDowell Signal Processing, Limited Liability Company's LIABILITY EXCEED THE PURCHASE PRICE FOR THE SOFTWARE. The disclaimers and limitations set forth above will apply regardless of whether you accept the Software.

### ***U.S. Government Restricted Rights:***

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c) (1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs (c)(1) and (2) of the Commercial Software Restricted Rights clause at 48 CFR 52.227-19, as applicable, McDowell Signal Processing, Limited Liability Company, Mountain View, CA 94043 (info@mc dsp.com).

### ***General:***

This Agreement will be governed by the laws of the State of California. This Agreement may only be modified by a license addendum which accompanies this license or by a written document which has been signed both by you and McDowell Signal Processing, Limited Liability Company. Should you have any questions concerning this Agreement, or if you desire to contact McDowell Signal Processing, Limited Liability Company for any reason, please email: legal@mc dsp.com. By downloading, using, or copying this Binary Software, Licensee agrees to abide by the intellectual property laws, and all other applicable laws of the U.S., and the terms of this License. Ownership of the software shall remain solely in McDowell Signal Processing, Limited Liability Company.

# 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 and Native plug-ins are compatible with Pro Tools™ HD, Pro Tools™ LE and Pro Tools™ M-Powered systems as well as Audio Unit compatible DAWs including Logic, Digital Performer (DP) and Ableton Live. Additionally, a third party software application that supports the TDM, RTAS, or AudioSuite plug-in standard may be supported.

McDSP plug-ins support Mac OS 10.5.x (Leopard), 10.6.x (Snow Leopard), Windows XP, Vista, and Windows 7. Supported versions of Pro Tools™ include 7.4.x and 8.x or greater. Supported versions of Audio Unit compatible DAWs including Logic, Digital Performer (DP) and Ableton Live must be versions that support the Mac OS 10.5x (Leopard) or 10.6x (Snow Leopard).

McDSP plug-ins require an iLok USB Smart Key for authorization.

### *Supported Plug-in Formats*

McDSP plug-ins are available in TDM, RTAS, AudioSuite, and Audio Unit (AU) formats.

### *Hardware*

McDSP plug-ins support any Avid (Digidesign) or approved third party hardware supported in Pro Tools™ 7.4.x and 8.x or greater, including HD and HD Accel hardware and interfaces, 002, 003, the Mbox product line, and M-Audio interfaces. McDSP plug-ins also support approved hardware for DAWs supporting Audio Units (AU) including Apogee, MOTU, and RME.

All McDSP HD plug-ins, except Synthesizer One, also support the Avid (Digidesign) VENUE D-SHOW systems.

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 Avid (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).*

Please visit [mcdsp.com](http://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 10.5.x or 10.6.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.

## 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 of 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.

## 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.

***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](http://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.

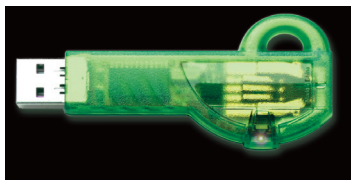
- Unzip the downloaded file and locate the folder named "TDM Plug-Ins" inside the unpacked folder.
- Using any CD-R burning application, burn this folder and its contents to an ISO format CD-R. It is recommended that you use a brand new CD-R for this, and do not rewrite an older CD-R.
- Once you have 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](http://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](http://iLok.com). [iLok.com](http://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](http://iLok.com), care must be taken to record your [iLok.com](http://iLok.com) account information (i.e. write down your User ID and Password in a safe place). If your [iLok.com](http://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](http://iLok.com) for more details about the benefits of using PACE's [iLok.com](http://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:

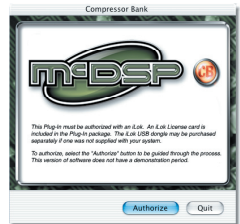
The Authorization Wizard is used to install an authorization from a License Card to the iLok USB Smart Key. To use the Authorization Wizard for the plug-in you purchased, perform the following steps:

- 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 the DAW host 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 DAW host insert menu.*

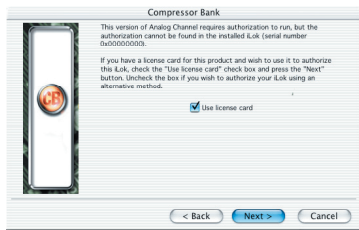


- McDSP plug-ins require that the user personalize their copy of the plug-in. A dialog is displayed soliciting this information.

*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.

*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. 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.

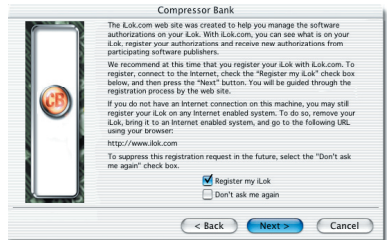




- Once the authorization is installed on the iLok USB Smart Key, a dialog is displayed prompting the user to register their iLok USB Smart Key at the [www.ilok.com](http://www.ilok.com) website. The iLok.com website was created to allow users to manage the software authorizations on their iLok USB Smart 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 DAW host 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 DAW host 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 10.5 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](http://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, email your iLok.com account information to: [support@mcdsp.com](mailto:support@mcdsp.com)  
To receive a demo authorization, email your iLok.com account information to: [authorize@mcdsp.com](mailto: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 screenshot shows the iLok.com v2.0 web interface. At the top, there's a navigation bar with links: Account, Manage, Buy, About, Help. Below this is a sub-navigation bar with: Overview, History, Profile, Order Status. The main content area is titled 'Welcome Bob!' and includes a message: 'You are logged into the new, improved iLok.com. New features with this version include:'. A list of features follows: Support for moving licenses between iLoks, Optional Zero Downtime coverage for your critical iLoks, Secure transfer of ownership between iLok.com account holders, Improved browser compatibility, including support for Apple's Safari browser, and Improved automated help and support. Below this, a section titled 'From this account section you can see a summary of your account, edit your account profile, and review your iLok.com history.' provides links to 'edit your account profile', 'review your iLok.com history', and 'important messages regarding your account'. At the bottom, a section titled 'To manage your iLoks, including viewing your iLok contents, receiving licenses from software vendors, or moving licenses between iLoks, click here.' provides a link to 'here'. On the left side of the interface, there's a sidebar with a section titled 'Important!' containing a link 'You have licenses' with a mouse cursor pointing to it. Below this are sections: 'Enhance your account' with links 'Buy an iLok', 'Buy a Dongle', 'Buy a Budget', and 'Move your licenses'; and 'What's new?' with a link 'Buy an iLok'.

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 synchronize 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 completion of the transaction, thereby letting you know that the transfer was successful.

## Pending licenses available for download:

Product	Company	Type	Deposited	Expiration
Analog Channel	McDSP	Demo	09/14/2004	03/14/2005
Chrome Tone	McDSP	License	09/14/2004	09/28/2004
Compressor Bank	McDSP	NFR	09/14/2004	09/14/2005
FilterBank	McDSP	License	09/14/2004	03/14/2005
HC2000	McDSP	Demo	09/14/2004	03/14/2005
Synthesizer One	McDSP	License	09/14/2004	09/28/2004

## Insert your iLoks and synchronize:

Before downloading licenses, you must insert one or more iLoks as needed and press the "Synchronize" button. Once your iLoks are synchronized with your account, you will be able to select the licenses to download and the target iLok to receive the licenses.

Note that the synchronization process may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.

[Synchronize](#)

## Step 1 - Select the pending licenses to download:

Product	Company	Type	Deposited	Expiration
<input type="checkbox"/> Analog Channel	McDSP	Demo	09/14/2004	03/14/2005
<input checked="" type="checkbox"/> Chrome Tone	McDSP	License	09/14/2004	09/28/2004
<input type="checkbox"/> Compressor Bank	McDSP	NFR	09/14/2004	09/14/2005
<input type="checkbox"/> FilterBank	McDSP	License	09/14/2004	03/14/2005
<input type="checkbox"/> HC2000	McDSP	Demo	09/14/2004	03/14/2005
<input type="checkbox"/> Synthesizer One	McDSP	License	09/14/2004	09/28/2004

## Step 2 - Select an iLok to receive the licenses:

Select which iLok should receive the licenses, then press the "Download Licenses" button.

Note that the download process may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.

☒ Select an iLok [Download Licenses](#)

If the **iLok1 (0x00011053)** is not in the list above, insert the iLok now and click [here](#).



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 log out and move the iLok Smart Key to your DAW host 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.

**iLok.com** v2.0 [Log Out](#) | [Help](#)

[Account](#) [Manage](#) [Buy](#) [About](#) [Help](#)

[View iLoks](#) [Download Licenses](#) [Transfer Licenses](#)

### View the contents of your iLoks

From here you can see what's on your iLok, register your iLoks, synchronize your iLok license contents with your account, and identify which iLoks are installed on your machine.

You have 1 registered iLoks. 0 are covered by Zero Downtime, 1 are not covered. [Sign up for Zero Downtime here.](#)

If your iLok does not appear in the list below, insert it now and press the "Synchronize" button. To identify which iLoks you currently have inserted, press the "Identify" button. Inserted iLoks will have a green button by them in the "Inserted" column.

Name	# Licenses	Last sync	Inserted	Covered
iLok1 ⓘ	5	09/14/2004		No

Note that the synchronize and identify processes may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.

## 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](http://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 your DAW host, and the McDSP plug-in and its presets are ready for use. Refer to your DAW User Manual for details on general plug-in operation.

### ***Exiting a McDSP Plug-in***

A McDSP plug-in is exited by closing the plug-in window, or de-instantiating the plug-in. Your DAW host sessions will save instantiated plug-in configurations and their settings. Refer to your DAW User Manual for details on general plug-in operation.

# MC2000

---

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 Pro Tools™ 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.
- **Analog Saturation Modeling**
- **Double precision processing**
- **Ultra Low Latency**

*\*All Trademarks are property of their respective owners. UREI™ and Teletronix™ are trademarks of the Teletronix/Universal Audio/UREI companies; dbx™ is a trademark of the Harmon Corporation; Neve™ is a trademark of AMS Neve; These companies are not affiliated in any way with McDSP, nor do they endorse the MC2000 plug-in. The trademarks of these companies are used solely for the purpose of describing the sounds produced by the McDSP MC2000 plug-in.*

## The Quick Start Tour: The MC2000 Plug-in

Start the DAW host and instantiate the MC2000 plug-in

- Launch your DAW host and open a 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 MC404 stereo configuration. Note MC2000 will operate on master or regular audio tracks in mono and 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 your DAW host and working with plug-ins, see the Reference Guide provided by your preferred DAW.

---

## MC2000 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

### Compression Display:

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



### Compressor (x4 in this example):

- Threshold
- Compression (Ratio)
- Knee
- BITE (Bi-directional Intelligent Transient Enhancement)
- Output (makeup gain)
- Input/Output metering
- Solo
- Master Link
- TC Circuit
- Metering

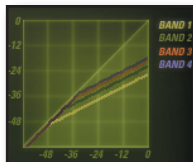
### Master Section:

- Input
- Output
- Band Crossover Frequencies (X1, X2, X3)

## Controls

### Master Section

- **Input** - the amount of gain applied to the signal before the multi-band compressor algorithm - i.e. the gain at the initial input stage
- **Output** - the amount of gain applied to the signal after the multi-band compressor algorithm - i.e. the gain at the final output stage
- **Crossover Frequencies (X1, X2, X3)** - frequency point at which a given band overlaps an adjacent band.



### Compressor

- **Output** - the amount of gain applied to the signal after the compressor algorithm. Commonly known as the 'make-up' gain.
- **Threshold** - the signal level at which the compressor begins to affect the signal
- **Comp (Ratio)** - the amount of signal level compression, as a ratio of input to output in decibels
- **Knee** - the compression response adjustment for making CompressorBank emulate different types of analog compressors
- **BITE** - the amount of transient (high frequency) signal that is less affected by the compressor
- **Solo** - mute all other band outputs - used to monitor a given compression band.
- **MSTR (Master)** - enable a compression band controls to link to and update all other band controls. Controls in 'slaved' bands can still be updated independently of 'master' band. Only one band can be the 'master' at any time.



### Time Constant Circuit

- **Attack** - the rate at which the compressor begins to respond to signals whose levels are above the threshold



- **Release** - the rate at which the compressor begins to stop responding to signals once their level drops below the threshold
- **TC Circuit Types** - the different types of detection and tracking algorithms:
  - Type-1 - pure peak detection
  - Type-2 - adaptive release
  - Auto - automatic attack and release
- **Release 2** - 5 msec to 5.0 sec
- **TC Circuit Types** -
  - Auto - automatic attack and release
  - Type 1 - pure peak detection
  - Type 2 - adaptive release

---

## Displays

---

### *Metering Section*

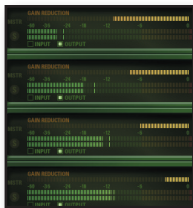
The MC2000 plug-in has metering for each compression band (compression gain and selectable input or output metering) and final output metering.

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.

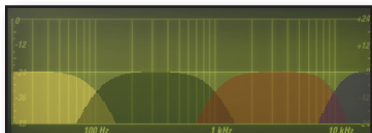
Stereo versions of the MC2000 configurations have two input/output meters, but still only one compression gain meter in each band, and two master output meters. Stereo versions of the MC2000 base their compression gain on a composite signal derived from the current left and right input signal levels.



---

## Cross Over Display

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.



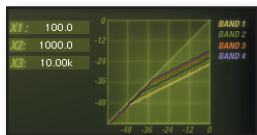
## Crossover Frequency Response Graph

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.

---

## Compression Display

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.



---

## General Information

To adjust any of the MC2000 controls the user can:

- Hold the <Command> key 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 to bring all the controls to their default values, or
- Use hardware controller surfaces supported by the MC2000 plug-in including the Mackie HUI and Digidesign's ICON™, ProControl™ and Control 24.

### ***Control Linking***

There is no control linking capability in the MC2000 at this time.

### ***Automation***

All MC2000 controls are completely automatable. See your DAW User Manual for automating plug-ins section.

### ***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 Pro Tools™ "plug-in Librarian" and "plug-in Settings" pop-up menus.

Refer to your DAW User Manual for accessing and saving plug-in presets.

### ***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. Once on the CB configuration the user has switched to are not present in that CB configuration's UI.

*\*All Trademarks are property of their respective owners. UREI™ and Teletronix™ are trademarks of the Teletronix/Universal Audio/UREI companies; dbx™ is a trademark of the Harmon Corporation; Neve™ is a trademark of AMS Neve; Avalon 2044™ is a trademark of Avalon Designs; Distressor is a trademark of Empirical Labs, Inc.; and 9473A is a trademark of the Altec Lansing Division of LTV Lang Altec Inc. These companies are not affiliated in any way with McDSP, nor do they endorse the MC2000 plug-in. The trademarks of these companies are used solely for the purpose of describing the sounds produced by the McDSP MC2000 plug-in.*

# Using the MC2000 Plug-in

## Basics

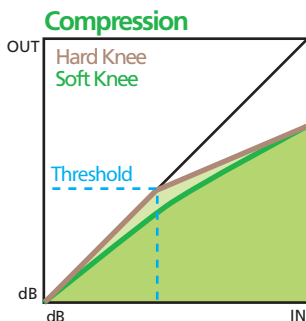
### Compression

A compressor affects the signal once the signal level is above the selected threshold. A compressor is used to reduce the output level of signals once they rise above the threshold. A ratio control determines the amount of gain reduction, as a ratio of the input to output (in dB). The higher the ratio, the more gain reduction is applied to the signal as it continues to rise above the selected threshold.

Gentle compression ratios are considered to be in the 2:1 to 4:1 range, while stronger ratios are 8:1 and higher. Attack and release times determine how fast the compressor begins to reduce signal levels (attack) and how fast the compressor recovers to a state where it is no longer affecting the input signal (release).

MC2000 has additional controls like BITE (Bi-Directional Transient Enhancement), multiple time constant circuits, and a Knee control capable of emulating compression responses of many classic analog compressors.

The MC2000 is a multi-band compressor. Instead of just one compressor operating on the entire frequency spectrum, the input signal is divided into two, three, or four bands, and a compressor is applied to each band. This approach is far more flexible than a conventional compressor, and provides the user with a new palette of dynamic range control.



---

## 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  $-12 \text{ dB} + 3 \text{ dB} = -9 \text{ dB}$ .

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. CompressorBank is unique because it gives the user multiple variations on these circuits. The Time-Constant (TC) Circuit section of CompressorBank is comprised of 3 controls: Attack, Release, 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.
- **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 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.

---

## 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 -24 to +24 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.

### *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.

## A Closer Look

### *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™.

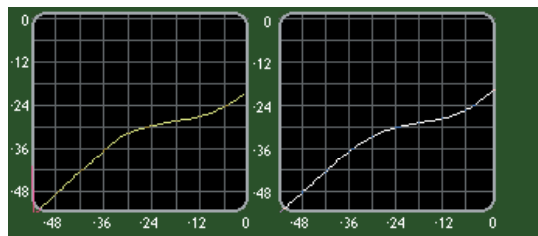
*\*All Trademarks are property of their respective owners. UREI™ and Teletronix™ are trademarks of the Teletronix/Universal Audio/UREI companies; dbx™ is a trademark of the Harmon Corporation; Neve™ is a trademark of AMS Neve; Avalon 2044™ is a trademark of Avalon Designs; Distressor is a trademark of Empirical Labs, Inc.; and 9473A is a trademark of the Altec Lansing Division of LTV Lang Altec Inc. These companies are not affiliated in any way with McDSP, nor do they endorse the MC2000 plug-in. The trademarks of these companies are used solely for the purpose of describing the sounds produced by the McDSP MC2000 plug-in.*

*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.

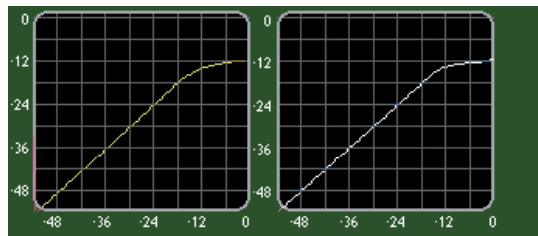


*Teletronix LA2A (left) and the MC2000 (right)*

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)*

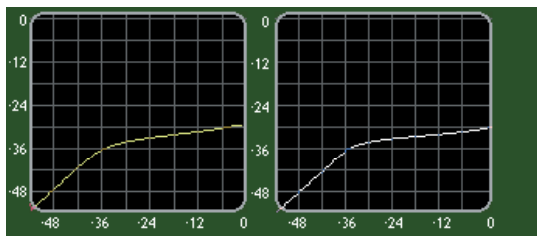
The MC2000's Knee control range of 0 to +10 models the 1176 knee shape nicely. The possible compression ratios of 4, 8, 12, 20, and '44' have been measured and transformed into MC2000 presets called 'blackface'.

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.

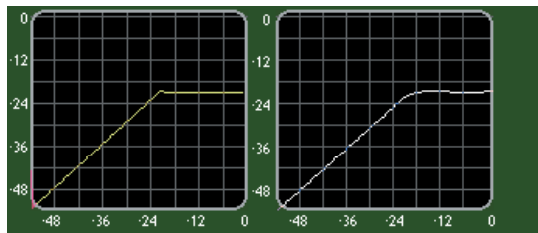


*Neve 33609 (left) and the MC2000 (right) at 6:1 compression*

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.





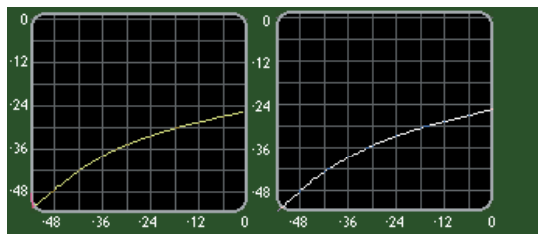
*Neve 33609 Limiter (left) and the MC2000 (right) limiter emulation*

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.

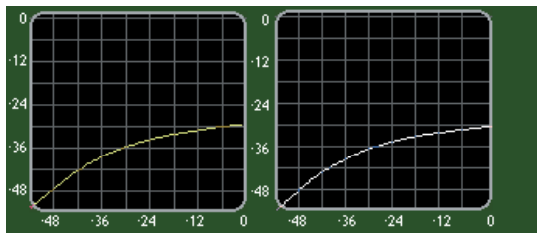
Presets in the MC2000 plug-in package derived from these models are called 'British Comp' and 'British Limiter'.

### **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*

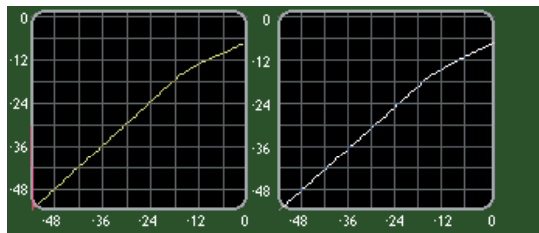
The transition from an un-compressed sound (1:1) to the selected compression ratio (4:1 and 6:1 above) is very gradual, to the point of obscuring the compressor threshold. Such a response allows the compressor to be transparent, even when applying a significant amount of compression.

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.

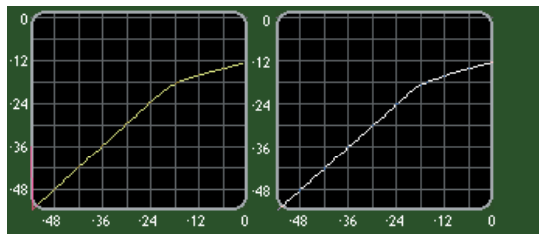
Presets in the MC2000 plug-in package derived from these models are called 'Old Smoothie'.

### ***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.

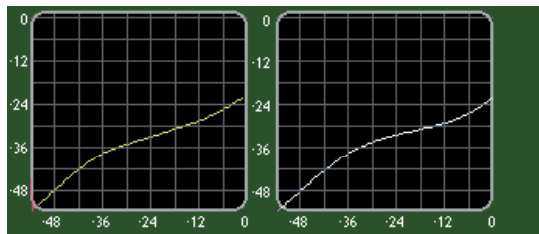


*AD2044 (left) and the MC2000 (right) at 2:1 compression*



*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	Range	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	-48 to 0 dB	Level at which the compression 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	0.25 to 25.0 msec	The rate at which the compressor responds to signals as they rise above the THRESHOLD.
RELEASE	25.0 to 2500.0 msec	The rate at which the compressor stops responding to signals as they fall below the THRESHOLD.

Parameter	Range	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.
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.
LINK	Unlinked, Master 1, Master 2	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)	-24 to + 24 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	

---

## 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
Compression band Gain, Threshold (Thr), Compression Ratio (Comp), Knee, Bite, Attack, Release	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 any of the MC2000 plug-in configurations is 3 (THREE) samples on HD systems. 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 (analog inserts such as EQ and compression do not cause a processing delay when inserted into a track).

---

## DSP Usage

### *Pro Tools™ 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. DSP usage is shown in the Pro Tools™ System Usage window.

### 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).





[www.mcdsp.com](http://www.mcdsp.com)

*Copyright 2010 by McDowell Signal Processing, LLC.  
All trademarks are property of their respective owners.  
McDSP is a trademark of McDowell Signal Processing, LLC.*