

# Pc•MACs

## Show Programming Software

Pc•MACs is the best selling Show Control Programming System in the World. It can be used to control animated shows and displays, fountains, fireworks, lighting, sound systems, simulators, slide and movie projectors, fiber optics, window displays, motors, pneumatic and hydraulic systems, special effects, signs, machines and machine tools in process control, or anything else that can be controlled by an electrical signal.

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## A note about this manual:

This manual covers the specifics of the Pc•MACs Show Programming Software. Throughout this manual, references are made to the Show Control hardware manufactured by Gilderfluke & Co.. These references include, but are not limited to the **Sd-50/nn**, **Br-miniBrick4**, **Br-miniBrick8**, **Br-ANA**, **Br-ZBR**, **Br-Brain4**, **Sd-25**, **Sd-10**, **v-Hd-to-DMX**.

For the specifics of each of these products, please refer to the item's specific manuals. All manuals can be found at:

<http://www.gilderfluke.com>

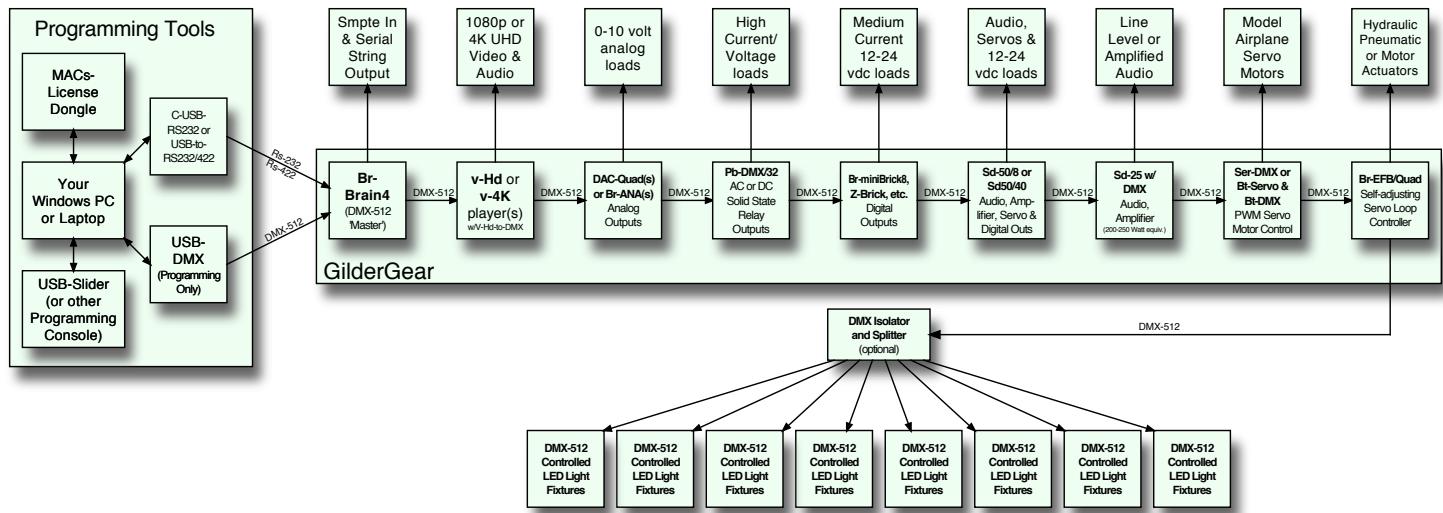
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## Pc•MACs Overview

The ‘PCMACs.exe’ program is used to create and edit ‘Shows’ using a standard Windows PC or laptop. The Pc•MACs software can be loaded onto any Windows compatible PC<sup>1</sup> and used to program any shows that are to be run on GilderGear.

Unlike lighting or MIDI software you may be familiar with, Pc•MACs is animation control software. Although you can choose other frame rates, most shows are updated at 25 or 30 frames each second. Pc•MACs treats every frame of every show as a separate ‘cue’. A new value for every output is sent on every frame of your show. There is no limitation to the number of outputs which can change within a single frame. This is something that would swamp most lighting boards, and MIDI could never hope to do.

A typical control system installation consists of one or more Gilderluke & Co. controllers, along with video, audio players and lighting gear, all networked together



using the USITT standard DMX-512 networking. Note that it is a rare project indeed which uses as much of a variety of GilderGear as shown in this one block diagram.

Just about all GilderGear can be used as either the ‘master’ for the DMX-512 network, or as one of the ‘slaves’. The PC that is running Pc•MACs is only temporarily attached to the DMX-512 ‘master’ (or in place of the DMX-512 ‘master’ in some cases) long enough to program your shows.

Since DMX-512 is used as the network for the system, all the standard third party devices that are available for DMX-512 will allow you to send it across wires, standard Cat5+ cables, wirelessly, through fiber-optics, etc.

<sup>1</sup> Windows XP, Vista, Win7, Win8 and Win10 have all been tested with Pc•MACs. Pc•MACs will also work on an Apple Macintosh running Windows virtualization software (Boot Camp, Parallels, VM Ware, etc.).

The capacity of a Pc•MACs Show Control System is twenty DMX-512 universes at one time. This works out to as many as 80,000 digital outputs, 10,000 eight bit resolution analogs, or any combination of the two. Pc•MACs supports a mix of analog resolutions of eight, twelve, sixteen, twenty-four or thirty-two bits.

'Programming' a show in Pc•MACs isn't anything like 'programming' a computer. In a typical project, your show is typically 'roughed in' using performance capture. You control the lighting, valves and actuators in your installation, moving whatever Pc•MACs is controlling in RealTime through Pc•MACs using your mouse and keyboard (or a programming console). If you have audio or video tracks in your show, these are played back at the same time. Because no one is coordinated enough (or has enough fingers) to manipulate more than a few channels at one time, you typically 'track up', recording only a few outputs on each pass. On each subsequent pass, you record a few more channels while those channels you have already programmed are played back. This is similar to how most audio recordings are produced.

At any time (even as they are being recorded) you can graphically display the channels you are working with on the OffLine Editing Window. They can then be edited using the dozens of graphical editing tools available to you in Pc•MACs. You can even just grab them and 'mush' them around using your mouse.

Once you are satisfied with your show(s), you typically save them to the controller that you are using as the DMX-512 'master'. For the smaller controllers like the Br-miniBrick4 or Br-miniBrick8, this is done through a serial port connection. For most other controllers, the shows are saved to a standard Sd or SdHC (or  $\mu$ Sd or  $\mu$ SdHC) flash card, which is then plugged into the DMX-512 'Master'.

At this point, your PC can be removed from the system. The device which has been designated as the DMX-512 'master' can run the show all by itself.

## Pc•MACs has two Licensing Modes

### **Pc•MACs without the MACs-License**

Without the MACs-License, you can use Pc•MACs for free to program any GilderGear. Most, but not all features are enabled for programming the first sixteen channels (128 digitals, eight analogs, or the equivalent mix of analogs and digitals). This is enough to cover the vast majority of small projects.

Channels above seventeen can still be programmed using the OffLine Editing Window, including by copying from the first sixteen channels which have been programmed using RealTime programming, performance capture and editing, and pasting them to the higher channels. You won't see the channels above sixteen play

back until the show is downloaded to the final playback system which has all the channels enabled for playback.

You can check the status of the USB dongle and permanent MACs-License from the '[Preferences](#)' menu's '[Hardware Setup / Security Key](#)'. If no key has been entered, the status will be displayed as 'DISABLED'.

Without a [Permanent](#) or [Temporary Numeric MACs-License](#), Pc•MACs enables:

- a) RealTime Programming on up to sixteen channels (128 digital, sixteen eight bit resolution analogs, or the equivalent mix of analogs and digital).
- b) Soft Console: A software-based programming console for programming up to eight analog channels and/or up to 36 digital functions. In addition, the digital inputs can be used to 'Bump' analog inputs to 100%, or as alternate buttons for the 'transport' commands ('play', 'record', 'rehearsal', 'pause'/continue' and 'stop'). A USB-Slider console, USB-AtoD, USB-MbJoystick or any standard gaming joystick<sup>2</sup> can be plugged into your PC and assigned via the Soft Console.
- c) Serial data output to GilderGear which is plugged into a serial port on your PC. This is limited to 16 eight bit channels. If the GilderGear is outputting DMX-512 data (acting as the DMX-512 'master'), the first sixteen channels of data will be converted into DMX-512 and sent to any attached DMX-512 'slaves'. Channels above sixteen will not be seen until you AutoDownload your show(s) to the DMX-512 'Master'. You will then see ALL of your channels when the show is played back from the DMX-512 'master'.
- d) OffLine Editing Window editing on up to 10,000 eight bit resolution channels (16,384 eight bit resolution analog outputs, 80,000 digital outputs, or the equivalent using a combination of analog and digital channels.



2 Be aware that the analog output of most gaming joysticks is not of very high quality or resolution.

## Pc•MACs with the MACs-License:

There are two types of keys to unlock all the features of Pc•MACs:

### a) Permanent Macs-License.

This is a green USB dongle, about the same size as a typical USB thumb drive. It can be plugged into any USB port on your PC to unlock all the RealTime features of Pc•MACs. The USB dongle can be freely moved between different PCs, but the license will only be active on the PC it is currently plugged into.



We recommend that you keep the USB Dongle on your key ring or in a safe place. It represents your license, and if you lose it, you will need to buy another.

You can check the status of the USB dongle and permanent MACs-License from the '[Preferences](#)' menu's '[Hardware Setup / Security Key](#)'. If the USB Dongle is properly installed, the status will be 'Hardware Key in Use'.

### b) Temporary Numeric License:

This license is only valid for fourteen days after activation. It is used to temporarily enable all the RealTime features of Pc•MACs, but only for two weeks. It is typically issued when a permanent MACs-License has been purchased, but the licensee would like to start using these features immediately. Because the [Temporary Numeric MACs-License](#) is based on the hardware serial numbers of the PC on which it was issued, it can not be moved between different PCs.

The temporary license can be obtained by calling, faxing or emailing the 'System Serial Number' to Gilderfluke & Co.. We will then return a [Temporary Numeric MACs-License](#) Security Key to you. Just type or copy and paste the key number into the Security Key Information dialog and press the 'validate' button.

You can check the status of the [Temporary Numeric MACs-License](#) Security Key from the '[Preferences](#)' menu's '[Hardware Setup / Security Key](#)'. If the Numeric License is properly enabled, the status



will be ‘Numeric License in Use’.

Either the [Permanent](#) or [Temporary Numeric MACs-License](#) will enable Pc•MACs for:

- a) RealTime Programming on up to 10,000 8 bit channels (10,000 eight bit resolution analog outputs, 80,000 digital outputs, or the equivalent using a combination of analog and digital channels).
- b) Serial data output to GilderGear which is plugged into a serial port on your PC
- c) High speed communications with the Br-Brain4, used for outputting up to four DMX-512 universes, reading smpte timecode, sending serial strings from the OffLine Editing Window’s Drag-n-Drop Triggers.
- d) USB-to-DMX support for reading and outputting DMX-512. Currently up to twenty [USB-DMX512 Adapters](#) can be attached to a PC which is running Pc•MACs.
- e) DMX importing via the [USB-DMX512 Adapters](#)
- f) Channel Mixer
- g) Multi-Sequencer show support
- h) Mackie Universal Pro and other hardware-based programming consoles
- i) ‘Eeprom’ Import and Export (used for importing and exporting raw binary channel data)
- j) Using DLLs to modify the data path through Pc•MACs. DLLs are small programs which can be added to Pc•MACs for custom input or output of show data in RealTime.

Although the programming hardware can be taken away and the show left to run on the PC, any PC running Windows is inherently unstable. At some point Windows is going to lock up. For short-term installations where there is staff available to reboot the PC if needed, this may not be a problem.

In most cases, once a show is programmed using the Pc•MACs software, the show(s) are then downloaded to one of our stand-alone Brick Show Control Systems. These eliminates the need for a PC as part of the final show control installation.

There are two programs in the Pc•MACs system. The first is called simply ‘Pc•MACs’. It is used to enter and edit animation data. Movements can be programmed real-time or at any speed down to single step, and then edited OffLine using a simple to use graphics interface. This uses the same ‘Cut’, ‘Copy’, ‘Paste’ commands you find in all Windows-based word processing programs.

The second program in the system is called ‘Pc•Pb’. This is a derivative of the Pc•MACs program that eliminates all the show entry and editing functions. It allows you to schedule and automatically play back shows, or to call up and play shows using the mouse and keyboard or using simple switch closure inputs.

This manual for the software can be found under the Help pulldown within the programs. This manual assumes that you are familiar enough with the care and feeding of PCs and Windows to install the hardware and software without needing step-by-step instructions on simple operations like starting a program or dragging files around.

Pc•MACs should run on any flavor of Windows from XP on up. In general, the faster the PC used and the more memory it has installed, the better Windows will run. The larger the screen, the better it will be for editing your shows.

We have clients who run Pc•MACs solely on a Windows ‘Pro’ tablet. Others use a laptop or desktop PC for Pc•MACs.

Some small ‘NetBooks’ have been tried, but have been found to be lacking in horsepower for all but the smallest shows. You will know when your PC is too slow to handle Pc•MACs if it locks up as soon as the OffLine Editing Window starts to scroll. If Pc•MACs stutters and no longer responds to keyboard and mouse commands until the show has ended playing, it is an indication that your PC is underpowered. Reducing the number of channels displayed on the OffLine Editing Window or disabling the OffLine Editing Window’s ‘Smooth Scrolling’ or screen scrolling altogether may allow it to run, so try this before you rush out to buy a new computer.

If you are using an Apple Macintosh computer, you can run Pc•MACs using virtualization software such as Parallels, Boot Camp or VM Ware. Any of these will allow Windows to run on your Mac as though it was a PC. ‘Wine’-based solutions, which don’t need a Windows installation to run, have been less successful at running Pc•MACs.

All GilderGear use DMX-512 for networking everything together. The DMX-512 standard was developed by the United States Institute for Theatrical Technology (USITT) for a high speed (250 KBaud asynchronous) serial link. Although it was originally designed for controlling light dimmers, it is now supported by hundreds of suppliers throughout the world for controlling all kinds of theatrical equipment.

## Multi-Sequencer Shows

The Br-Brain4 is the only piece of GilderGear that currently supports multiple Sequencers in a single AutoDownload file. You may have previously used Multiple Sequencer shows before without even knowing it. If you have programmed a number of shows that each run on independent pieces of GilderGear in the same installation, you have programmed Multi Sequencer shows! Each of the show controllers can be triggered simultaneously to run as one big show, or triggered independently to run separate asynchronous shows. This is essentially what happens with the multiple sequencers within a Br-Brain4. It is like having eight separate show controllers that can be triggered simultaneously or independently, all within one Br-Brain4.

A Pc•MACs version 2.02.216.xxx or later are required to program shows to run on a Br-Brain4. Only they will generate the version 1.1 AutoDownload files that the Br-Brain4 requires. These versions also support multiple sequencers on the Br-Brain4.

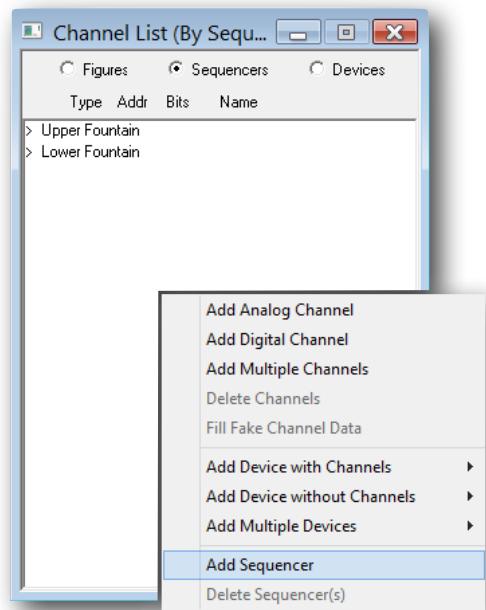
Only users with a MACs-License are able to create and program multiple sequencers shows on Pc•MACs. Without a license, you will be limited to a single sequencer.

Because the analog and digital outputs are walled off between each sequencer in a Multi-Sequencer installation, it is possible to have the same show running on all eight of the Br-Brain4's sequencers. The Br-Brain4 doesn't care if the shows are started simultaneously or hours apart.

An example of a multi-sequencer project would be an attraction with eight separate show rooms. The shows in each of these rooms can run completely independently from the other seven. As the guests enter each room (in a vehicle or on foot), the animation, Audio/Video, lighting, etc. are triggered for that one room. Meanwhile, the other seven rooms can be processing their own triggers and running their shows, oblivious as to what is happening in the other rooms.

To configure a Multi-Sequencer show, you must first create the sequencers in the [Channels List](#), as you would for any single-sequencer show. You then switch to the sequencer view in the [Channels List](#). LeftClick in the [Channels List](#) and a shortcut menu will appear:

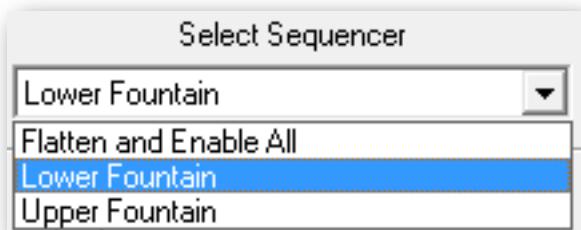
Select the '[Add Sequencer](#)' command. The default name will be 'Sequencer n'. You can rename it as desired. In the example above, the two pre-existing sequencers are called 'Upper Fountain' and 'Lower Fountain'.



After creating a new sequencer, you can then drag-n-drop the desired channels from the other sequencers into the new sequencer. By default, channels are added to 'Sequencer 0' as they are created, so that is probably where you will find most of the channels you need to move.

To program a Multi-Sequencer show, you must select the specific sequencer you want to program from the drop-down on Pc•MACs Main Control Window. This will remove any channels that run on other sequencers from the Mixer, Soft Console, OffLine Editing Window, etc., so that you can't possibly accidentally program a channel that is supposed to only run only on another sequencer. You can choose under the ['Preferences' menu's 'When Selecting a Different Sequencer'](#) command whether the hidden outputs will be kept at their current levels, or ramped to their 'default' values.

You can also choose the 'Flatten and Enable All' option, which gives you access to all channels on all sequencers. This should be used carefully, and is intended for programming the 'Main'/'First' show in a [PopOut](#) show projects.



## PopOut Shows

PopOut shows are a variation on the multi-sequencer features of the Br-Brain4. They are used for two different playback scenarios from a Br-Brain4:

You have a room full of animated displays that spend most of their time running shows independently of one another. On occasion, you want all of these displays to run as one big coordinated show. In this case, the 'Main' show is normally stopped, and the PopOut shows are run as needed. To run the 'big' show, the PopOut shows on the PopOut sequencers are all stopped, and only the 'main' show is run on the first sequencer.

You have an animated figure that spends most of its time running all its outputs as part of a single timeline. In the midst of running this timeline, individual body parts of a character can be triggered to 'break out' and run a PopOut show as an ad-lib or to respond to a heckler or other event in the theater. At the end of the PopOut show, the PopOut Sequencer will stop, and the character's body parts will then rejoin the main show in progress. As the PopOut show is triggered or ends and rejoins the main timeline show, all effected analog functions for that character automatically do an Easeln so there is no jump in the animation as the main show is exited or rejoined.

In all multi-sequencer shows, the analog and digital outputs are confined to running on the sequencer to which they have been assigned. Outputs that are assigned to a sequencer will completely ignore anything that happens on any other sequencer.

When a PopOut show is running, it will run just like any other multi-sequencer show. Where PopOut shows are different is when they are NOT running. When a PopOut show is loaded on a sequencer, but not running, the outputs that are assigned to it will start following whatever show is playing on the first sequencer.

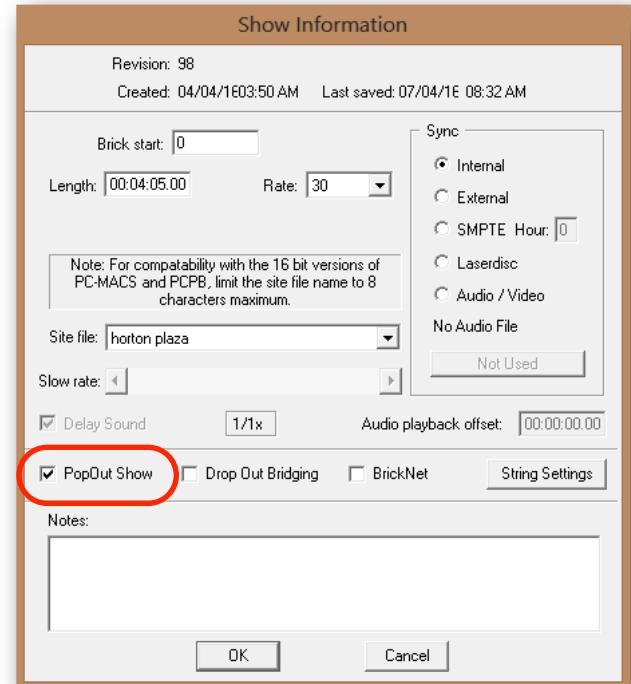
The 'Main'/'First' show is programmed not only with the outputs assigned to its sequencer. It also has the outputs assigned to the PopOut sequencers programmed into it.

A PopOut Show is created exactly like any Multi-Sequencer show. What turns it into a PopOut show is simply checking the ' PopOut Show' checkbox on the 'Show Information....' dialog (found under the 'File' menu's 'Show Information....' or 'New Show' dialog).

PopOut shows are set up exactly as any other multi-sequencer show.

### The ‘Rules’ for the PopOut Show(s) are:

- Any shows that are used for PopOuts must have the ‘PopOut Show’ checkbox on the ‘Show Information....’ dialog (found under the ‘File’ menu’s ‘Show Information....’ or ‘New’ Show dialog) checked.
- The first sequencer is reserved for the ‘main’ show. The Br-Brain4’s other seven sequencers are all available for running PopOut shows. (up to seven at one time!) To distinguish sequencers that are used for PopOut shows, we’ll refer to them as ‘PopOut Sequencers’. Any of the Br-Brain4’s sequencers that are not being used as the ‘Main’ show or PopOut Sequencers can be used for regular multi-sequencer shows.
- Only the analog and digital outputs you want to run as part of a PopOut should be moved to the PopOut Sequencer(s). If you have one figure (group of analog and digital outputs) you want to run as part of a PopOut show, just drag it to the PopOut Sequencer. If you have two or more figures you want to use for a PopOut, drag them all to the PopOut Sequencer.
- Before programming a PopOut show, select the PopOut sequencer from the drop down on Pc-MACs’ Main Control Window. Only the Analogs and digitals that have been assigned to this PopOut sequencer will be available from the mover dialogs and consoles for programming and editing. When you play this PopOut Show in Pc-MACs, only the PopOut Sequencer’s outputs will play.
- You should only run PopOut Shows on the PopOut Sequencers for which they are intended.
- Trigger PopOut shows using only ‘Play’ (not ‘loop’) commands. This lets them end and drop back into the ‘First’/‘Main’ sequencer at their ends.

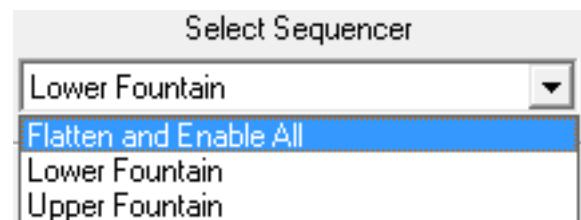


### The ‘Rules’ for the ‘Main’ show(s) in PopOut applications are:

- The first sequencer in Pc-MACs must be used for the ‘Main’ show. ‘Sequencer 0’ is the default name for this first sequencer, but you can rename it anything that

you like. This sequencer will be referred to as the ‘Main Show’ Sequencer or ‘First’ Sequencer.

- b) The ‘Main Show’ Sequencer MUST also be assigned to the first sequencer slot on the Device Setup dialog for the Br-Brain4.
- c) All the analog and digital outputs you aren’t running as part of a [PopOut](#) Show or other multi-sequencer show(s) should be left in the ‘Main Show’ Sequencer.
- d) Before programming a ‘Main’ show, select the ‘Flatten and Enable All’ option from the drop down on Pc•MACs’ Main Control Window. ALL the Analogs and digitals that have been created will be available from the mover dialogs and consoles. When you play this ‘Main’ Show in Pc•MACs, all the outputs will play.
- e) Once AutoDownloaded to the Br-Brain4, You should only run the ‘Main’ Show(s) on the ‘Main Show’ Sequencer.



#### Once AutoDownloaded onto a Br-Brain4, [PopOut](#) shows work as follows:

If a show with the ‘[PopOut](#) Show’ checkbox checked is loaded on any sequencer except the ‘First’/‘Main’ sequencer, and is NOT running, it will play data from whatever show is running on the ‘First’/‘Main’ Show sequencer.

If a show with the ‘[PopOut](#) Show’ checkbox checked is loaded on any sequencer but the ‘First’/‘Main’ sequencer, and IS running, it will play the current [PopOut](#) show.

GilderGear Name	Show Control	Audio Player	Other Features	DMX-512 Input	DMX-512 Output	Show Control Outputs
Sd-10		Yes (stereo)	Line Level Out			
Amp-50			50 Watt Digital Class-D Amp			
Sd-25		Yes (stereo)	50 Watt Amp Mixer Input			1 Status Output
Sd-50/0		Yes (stereo)	100 Watt Digital Amp			
Sd-50/8	Yes	Yes (stereo)	100 Watt Amp 8 ServoMotors*	1 Universe (512 Chan.)	1 Universe (512 Chan.)	Up to 8 Digital
Sd-50/40	Yes	Yes (stereo)	100 Watt Amp 8 ServoMotors*	1 Universe (512 Chan.)	1 Universe (512 Chan.)	Up to 40 Digital
Br-miniBrick4	Yes					Four Digital
Br-miniBrick8	Yes		Two PCM ServoMotor Outputs	1 Universe (512 Chan.)	64 DMX-512 Channels*	8 Digital 2 Servo
Z-Brick (Br-ZBR)	Yes			1 Universe (512 Chan.)	1 Universe (512 Chan.)	32 Digital
Br-ANA	Yes			1 Universe (512 Chan.)	1 Universe (512 Chan.)	16 Analog
DAC-Quad	Yes		Four PCM ServoMotor Outputs	1 Universe (512 Chan.)	1 Universe (512 Chan.)	Four Analog
Br-Brain4	Yes		Smpte Reader, DVD Control	1 Universe (512 Chan.)	4 Universes (2048 Chan.)	
Pb-DMX/8, Pb-DMX/16, Pb-DMX/24 or Pb-DMX/32	Yes		3.5 Amp AC or DC Relays.	1 Universe (512 Chan.)	300 DMX-512 Channels*	up to 32 3.5 amp Relays
USB-to-DMX512	Yes		DMX in/out for your Windows PC	1 Universe (512 Chan.)	1 Universe (512 Chan.)	
Br-SDC			Serial Device Controller			
Br-SDC8			Serial Device Controller and Port Multiplexer			
SER-DMX	Yes		16 PCM Servo-Motor Outputs	1 Universe (512 Chan.)	1 Universe (512 Chan.)	16 PWM Outputs
BrightSign UHD or HD Video		Yes (stereo)	4K UHD, 1080p, 1080i, 720p, 576p, 480 Video Player			
LG-DMX/DC			12-24 vdc DMX-512 Dimmer	1 Universe (8 Chan.)		
DP-DMX20L			115 vac DMX-512 Dimmer	1 Universe (4 Chan.)		

Trigger Inputs	Clock/Calendar Schedules	Serial Port(s)	Memory	Flash Card	Starter Kit	Notes
Two Opto + Serial		Rs-232 (optional)	Sd Cards up to 32 GBytes	removable Sd or SdHC	Yes	CD player Replacement
						Equiv. to a 200-250 Watt Amp
Two Opto + Serial		Rs-232/422 (optional)	Sd Cards up to 32 GBytes	removable Sd or SdHC	Yes	Equiv. to a 200-250 Watt Amp
Eight Opto + Serial		Rs-232	Sd Cards up to 32 GBytes	removable Sd Card	Yes	Equiv. to a 400-500 Watt Amp
Four+Eight* + Serial	Yes (GPS Optional)	1) Rs-232 1) Rs-422	Show: 4 or 8 MBytes	removable Sd Card	Yes	* Uses 8 Show Control Outputs
Four+Eight* + Serial	Yes (GPS Optional)	1) Rs-232 1) Rs-422	Show: 4 or 8 MBytes	removable Sd Card	Yes	* Uses 8 Show Control Outputs
One Opto		Optional	8 KBytes			Our smallest controller
Two Opto + Serial		Rs-232	64 KBytes			* DMX-512 outs eat up Memory
Four Opto + Serial		Rs-422	Sd Cards up to 32 GBytes	removable Sd or SdHC		Combines functions of Br-multiBrick32 and 7 Dimmer
Four Opto + Serial		Rs-422	Sd Cards up to 32 GBytes			DMX-512 to Analog Card
Two Opto + Serial		Rs-232	micro Sd up to 32 GBytes	removable micro Sd		DMX-512 to Analog Card
Ten Opto + Serial	Yes (GPS Optional)	2) Rs-422	Sd Cards up to 32 GBytes	removable Sd or SdHC		Plays 8 asynchronous shows
Two Opto + Serial		Rs-232	4 or 8 MBytes			* DMX-512 outs eat up Memory
						Turns PC into Show Control System
Ten Opto		1) Rs-232 or Rs-422				Runs video players or other serial gear
Ten Opto + Serial		8) Rs-232 1) 232/422				Runs 8 video players or other serial gear
Two Opto + Serial		Rs-232	micro Sd up to 32 GBytes	removable micro Sd		DMX-512 to pwm ServoMotors
Eight TTL (select models only)	Option on some models	Rs-232	Sd Cards up to 32 GBytes	removable Sd, SdHC or SdXc cards	Yes	Up to 1080p, MPEG-2, H.264/MPEG-4
						DMX-512 to DC Dimmer
						Other dimmer sizes available

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# Additional GilderGear for Pc•MACs Systems

There are several hardware options for your Pc•MACs programming system:

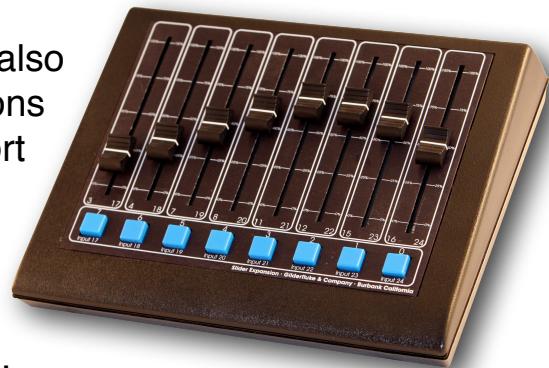
## Programming Consoles and Other Input & Output Gear:

There are currently four Programming Consoles available from Gilderfluke & Company for use with a Pc•MACs Show Control Systems:

### 1) USB-Sliders:

The USB-Slider is a general purpose programming console that can be used in all kinds of shows. It is rugged, light weight, and easy to carry in your laptop computer's bag.

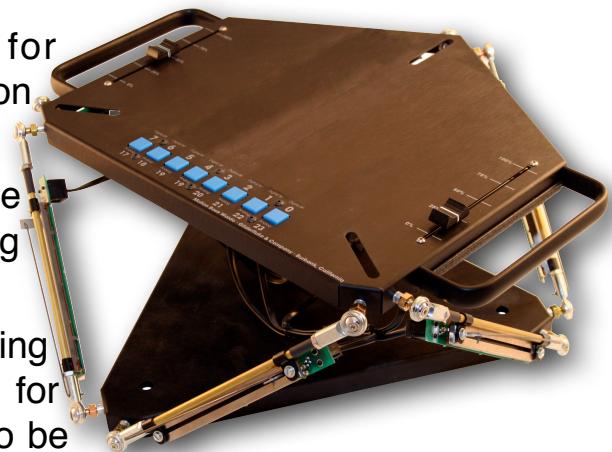
- a) Eight 100mm long throw slide pots.
- b) Eight Digital button inputs. These can also be assigned to 'Bump' analog functions or control Pc•MAC's basic transport functions.
- c) Four additional Digital inputs for expansion.
- d) Twelve bit native analog resolution.  
Supports eight through sixteen bit resolution channels.
- e) Full-speed 12 Mb USB connection. For best results, don't mix with mice or keyboards with low speed USB connections on the same hub. These can slow down the USB connection to the USB-Sliders.
- f) Plug-n-Play USB connection to your PC using the included cable.



### 2) USB-MbJoystick:

The USB-MbJoystick is used for programming 3-DOF or 6-DOF motion bases by simply 'flying' them.

- a) Two extra 100mm long throw slide pots. Use these for controlling lighting or other 4-D effects.
- b) Eight Digital buttons for programming digital functions and 4-D effects or for controlling Pc•MACs. These can also be

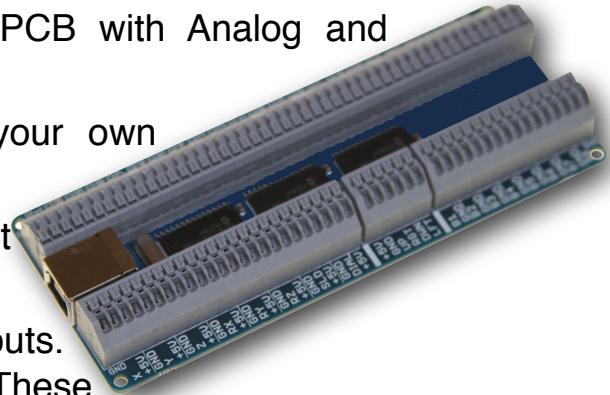


- assigned to ‘Bump’ analog functions or control Pc•MAC’s basic transport functions.
- c) Four additional Digital inputs for expansion.
  - d) Twelve bit native analog resolution. Supports programming of eight through thirty-two bit resolution channels.
  - e) Full-speed 12 Mb USB connection. For best results, don’t mix with mice or keyboards with low speed USB connections on the same hub. These can slow down the USB connection to the USB-MbJoystick.
  - f) Plug-n-Play USB connection to your PC using the included cable.

### 3) USB-AtoD:

The USB-AtoD can be used to build your own programming console or Waldo.

- a) 4.84"x1.95" (123mm x 49.5mm) PCB with Analog and Digital inputs and USB output.
- b) Use the USB-AtoD for making your own custom consoles and Waldos<sup>3</sup>.
- c) Eight 0-5 volt analog inputs. Just attach potentiometers.
- d) Thirty-six (36) discrete digital inputs. Just attach buttons or switches. These can also be assigned to ‘Bump’ analog functions or control Pc•MAC’s basic transport functions.
- e) Twelve bit native analog resolution. Supports programming of eight through thirty-two bit resolution channels.
- f) Full-speed 12 Mb USB connection. For best results, don’t mix with mice or keyboards with low speed USB connections on the same hub. These can slow down the USB connection to the USB-MbJoystick.
- g) Plug-n-Play USB connection to your PC using the included cable.



3 A ‘Waldo’ is a model of the thing you are controlling. Move the Waldo and the real thing follows.

#### 4) Universal Pro and Expansions:

- a) Each Universal Pro and Expansion has eight 100mm motorized digital sliders for programming.
- b) The Universal Pro can have up to three expansions added to it, for up to 32 analog or digital inputs.
- c) Motorized sliders move to follow the programmed data. Recording starts the instant you touch a slider.



- d) An LCD 'Scribble Bar' shows the names of all the movements right above each slider.
- e) Pc•MACs transport controls right on the console. Large LED for displaying timecode of your shows.
- f) Auto selecting 100 to 240 vac supply for operations anywhere in the world.
- g) Plug-n-Play USB connection to your PC using included cable. Expansions attach to the Universal Pro.

#### USB-DMX512 adapters:

(Requires a MACs-License) Each USB-to-DMX dongle plugs into a USB port on your computer to provide a single DMX-512 input or output. As of this writing, Pc•MACs will support up to ten [USB-DMX512 Adapters](#) for DMX-512 output, and one [USB-DMX512 Adapter](#) for DMX-512 input at the same time.

All GilderGear use DMX-512 for networking everything together. The DMX-512 standard was developed by the United States Institute for Theatrical Technology (USITT) for a high speed (250 KBaud asynchronous) serial link. Although it was originally designed for



controlling light dimmers, it is supported by thousands of suppliers throughout the world for controlling all kinds of theatrical equipment.

## **USB-to-Rs232 and USB-to-RS422 adapters:**

For systems with less than sixteen channels, both the MACs-License and [USB-DMX512 Adapter](#) may not be needed. Pc•MACs can communicate with the controller that will be used as the DMX-512 ‘Master’ using the standard serial port. The ‘Brick’ that will be the DMX-512 ‘Master’ can take this serial data and use it to translate the first sixteen channels into DMX-512 to control lighting and other DMX-512 compatible ‘slaves’.

### **1) c-USB-to-RS232:**

The **c-USB-to-RS232** is used to convert the USB ports found on most computers for use with the RS-232 serial standards.

These converters are optimized for use with PCs and Gilderluke & Co. systems. The RS-232 serial connection is the DE-09 male connector.

Some of our smaller systems use the serial standard known as RS-232 was the standard for all serial ports on PCs for years (before USB). RS-232 ports are limited to just fifty feet of wire and a single piece equipment on each serial port. The RS-232 serial connection is the male DE-09 on the **c-USB-to-RS232**. It will plug right into a Br-MiniBrick8 or Sd-50 serial cable.

Although the **c-USB-to-RS232** supports both the RS-232 and RS-422 ports, it only one should be connected at a time. If you connect both, the data will be transmitted out both ports. Data received from either port will be sent to the PC properly, so long as they don’t overlap. If data arrives simultaneously, then the PC will receive gibberish..

### **Features of the c-USB-to-RS232 include:**

- a) Converts the USB ports found on most computers to RS-232.
- b) DE-09 connector for direct connection to all RS-232 devices.
- c) Green LED shows data transmitted by PC.
- d) Red LED shows data received by PC.
- e) Powered by the USB port. No external power supply is needed.
- f) Drivers available for both PCs and Macs (and most other OS’s as well)

## 2) USB-to-RS232/422:

The [\*\*USB-RS232/422\*\*](#) is used to convert the USB ports found on most computers for use with the RS-232 or RS-422 serial standards.

Most of the Systems from Gilderfluke & Co. use the standard known as RS-422. RS-422 allows a PC to communicate with many pieces equipment simultaneously, and/or from a distance of up to a mile.

These converters are optimized for use with PCs and Gilderfluke & Co. systems. The RS-422 serial connection is the RJ-12 connector used most of our equipment. A short RJ-12 cable is included with each converter.

Some of our systems use the serial standard known as RS-232 was the standard for all serial ports on PCs for years (before USB). RS-232 ports are limited to just a few feet of wire and a single piece equipment on each serial port. The RS-232 serial connection is the male DE-09 on the [\*\*USB-RS232/422\*\*](#). It will plug right into a Br-MiniBrick8 or Sd-50 serial cable.

Although the [\*\*USB-RS232/422\*\*](#) supports both the RS-232 and RS-422 ports, it only one should be connected at a time. If you connect both, the data will be transmitted out both ports. Data received from either port will be sent to the PC properly, so long as they don't overlap. If data arrives simultaneously, then the PC will receive gibberish..

### Features of the c-USB-to-RS232 include:

- a) Converts the USB ports found on most computers to RS-422 or RS-232.
- b) RJ-12 connector for direct connection to all Gilderfluke & Co. RS-422 ports.
- c) DE-09 connector for direct connection to all RS-232 devices.
- d) Green LED shows data transmitted by PC.
- e) Red LED shows data received by PC.
- f) Powered by the USB port. No external power supply is needed.
- g) Drivers available for both PCs and Macs (and most other OS's as well)

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## GilderGear for Pc•MACs Outputs, Stand-Alone & DMX-512 ‘Masters’:

Pc•MACs can use any device that accepts a DMX-512 network as an output device. This includes virtually all theatrical dimmers, intelligent light fixtures and effects (fans, snow and smog machines, strobe lights, etc.).

What no third party DMX-512 receiver can do is store your completed Pc•MACs shows so that the PC can be removed from the system. For this, you will need at least one piece of GilderGear to take over the functions of the PC as the DMX-512 ‘master’.

In most cases, this controller ‘Brick’ has already been in place through all of your Pc•MACs programming, as you have been using its outputs for controlling portions of the show. When this ‘brick’ receives serial or DMX-512 show data from an external source like Pc•MACs, it automatically turns itself into a DMX-512 ‘slave’, and has been passing the DMX-512 received from Pc•MACs through to all the other DMX-512 ‘slaves’ attached downstream.

To turn this ‘brick’ back into a DMX-512 ‘master’, all you need to do is:

- 1) Turn off and/or unplug the DMX-512 or serial data coming from Pc•MACs. After a short delay (less than 10 seconds), the ‘DMX Rx’ indicator will go out and the ‘Brick’ has become a DMX-512 ‘Master’ again<sup>4</sup>.
- 2) Download your completed shows to the ‘Brick’:
  - a) On smaller ‘Bricks’ which don’t have removable memory for storing their shows, this means you send your shows to the ‘Brick’ through the serial port (On the [‘File’ menu’s ‘Save as AutoDownload Command’](#), use the [‘Download’ button](#)).
  - b) On most ‘Bricks’, which use Sd or  $\mu$ Sd card slots for storing the shows on removable flash cards, Pc•MACs saves your shows to the ‘Downloads’ folder it creates in the folder where you have your shows stored (On the [‘File’ menu’s ‘Save as AutoDownload Command’](#), use the [‘Build’ button](#)). You then drag-n-drop the AutoDownload file to the flash card, and then plug the flash card into your ‘Brick’.
- 4) If you are serially AutoDownloading the files to your ‘Brick’, Pc•MACs will stop the DMX-512 and/or serial data being sent to the ‘Brick’ to allow you to do your AutoDownload. The DMX-512 and/or serial data will remain off until you close the AutoDownload ‘completion’ dialog. This lets you test your AutoDownload without having to manually unplug or turn off anything. The ‘Brick’ will remain as the DMX-512 ‘Master’ until the ‘completion’ dialog is closed. At that time, the DMX-512 and/or serial data will resume transmitting from Pc•MACs, and the ‘Brick’ will once again become a DMX-512 ‘Slave’ to Pc•MACs.

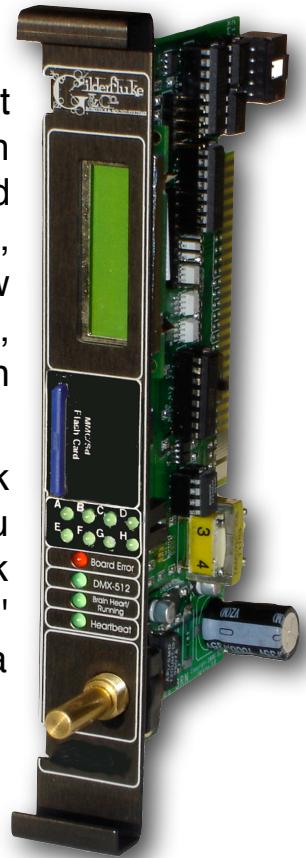
There are many different types of Show Controller ‘Bricks’ available from Gilderfluke & Company for use with a Pc•MACs Show Control Systems. Each of them offer a different selection of inputs and outputs, and which ones you choose for your show are determined by your needs. With the one exception of the Br-miniBrick4, all of them can be used as either a DMX-512 ‘Master’ or ‘Slave’:

### 1) Br-Brain4:

The Br-Brain4 combines the functions of earlier Smart Brick Brains with the DMX-512 storage and output features of the Br-SmartMedia. With the appropriate output cards, it can control anything that can be manipulated with an electronic signal. These include animated shows and displays, fountains, fireworks, lighting, sound systems, simulators, slide and movie projectors, fiber optics, window displays, motors, pneumatic and hydraulic systems, special effects, signs, machines and machine tools in process control, etc.....

You use a ‘Smart’ Brick System when you need to lock a number of ‘Smart’ Bricks together, and especially if you need to lock to an external time code. The ‘Smart’ Brick Brain acts as the time code reader. Any number of ‘Smart’ Bricks, and even other Br-Brain4s can be synced to a Brain through the ‘Smart Brick Network’.

The DMX-512 output of the Br-Brain4 can control up to 2048 channels on four full DMX-512 universes. Within the DMX-512 streams, eight separate ‘sequencers’ can be run independently of all the others, each with their own triggers. This means that some of the outputs can be used to control one show while the other outputs are divided among the seven other sequencers, each independently running their own shows.



#### Features of the Br-Brain4 include:

- a) Locks to Smpte, Pioneer LaserDisc and DVD time codes, or runs from internal clock.
- b) RealTime Clock for scheduling when shows will be played. Can be ‘GPS’ clock synchronized.
- c) LCD display and encoder for monitoring and setting minor adjustments. Configured through serial port.

- d) Modes allow it to control Moog motion bases, MIDI devices, and other serially controlled devices.
- e) Individual channels, or even bits within a single eight bit channel, can be run from separate sequencers.
- f) DMX-512 data can be recorded onto the Br-Brain4 card from any DMX-512 data source. You can sample the output of an expensive lighting board to replace it with a Br-Brain4 once your programming is done.
- g) Supports up to 255 shows at one time. You can set any show to loop or play through just once.
- h) Shows can be selected and played using the networkable RS-422 serial port, or ten optoisolated inputs.
- i) Ease-In functions will generate a smooth cross fade when any sequencer is told to do something that might otherwise generate a jump in an analog channel.
- j) Can be used to control any DMX-512 compatible devices. These include most Gilderfluke & Co. equipment, and virtually all moving lights, dimmers, smoke machines and strobes.
- k) Show data is stored on standard Sd or SdHC cards. These can hold days of DMX-512 show data.

## 2) Br-EFB/Quad:

The Br-EFB is used when you need to close an analog servo loop used to control pneumatic and hydraulic cylinders or DC motors. These are used in animated shows, motion bases, industrial systems, special effects, fountains, and more.



An EFB controller measures the position of an actuator, compares this with the position it is being told to be at, and opens or closes the valve (or turns on or off the motor) as needed to get the actuator to where it should be. The Br-EFB does this thousands of time each second. The Br-EFB also supports 'compliance', which adds force feedback to the servo loop.

## Features of the Br-EFB/Quad include:

Up to four independent axis of PID (Position, Integral and Differential) Electronic Feedback.

Resolution of eight, twelve or sixteen bits for each axis being controlled. Sixteen bit resolution A/D used for position and compliance feedback.

Sixteen bit resolution +/- 10 vdc outputs can run most servo valves, VFDs and motor drivers.

Highly oversampled PID loop for outputs smooth enough to run even the largest motion bases.

Self adjusting initial setup, and automatic adjustment while running. You can also configure the servo loops manually.

Actuator endpoints can be limited anywhere within the range of movement, and even reversed.

Each axis has a removable screw terminal block for connections to the actuator: Ground and 24 VDC for powering the valve and feedback sensors (PTC fused at 1.1 Amp), Position Feedback Input (0-5, +/-5, 0-10 or +/-10 dc), Compliance feedback input (0-5, +/-5, 0-10 or +/-10 dc), -10/+10 vdc reference for using potentiometers for position feedback, and positive and negative outputs for controlling the valve/motor.

'Enable' input disconnects the valve outputs from the Br-EFB and connects them to 'Battery' input. A small voltage on these terminals can be used to gently park the actuators, even in the event of a complete power failure.

Show programs are stored on standard micro Sd/SdHC Flash cards for a virtually unlimited capacity (up to 32 GBytes). Like all GilderGear, up to two hundred fifty-five shows can be loaded onto a Br-EFB.

Networkable! Transmits a full 512 channel DMX-512 universe to act as a network 'master', or receives a full 512 channel DMX-512 universe to use as a 'slave'. Uses USITT-standard pinout for DMX-512 through RJ-45 cables. DMX-512 input/output/thru to daisy-chain using standard Ethernet patch cords.

Ethernet (10/100) for configuring, monitoring and communicating with the Br-EFB. Web-based configuration screens for setting up and adjustments.

Triggerable! Two non-polarized optoisolated inputs or the networkable RS-422 serial port can be used to start, stop, pause, continue, or access

shows. Rising or falling edges can trigger different actions, including random and sequential playlist commands. Rj-12 Rs-422 input/output/thru for easy daisy-chaining.

Sturdy aluminum enclosure. Mounts in Snap Track, DIN rail (optional), or just Velcro or screw it down.

The Br-EFB is designed to run on 24 vdc.

### 3) Sd-50/8 and Sd-50/40:

The Sd-50 is a complete stand alone stereo audio playback system. The show control and DMX-512 output options make it into a complete Audio and Show Control solution.

Features of the Sd-50 include:

- a) Stereo playback of standard Mp3 or .WAV audio files. Up to 255 different SoundFiles can be selected and played. Sound capacity limited only by the size of your Sd flash card.
- b) Two line level outputs (RCA Jacks) and 100 Watt stereo Class-D amp with the power of 400-500 Watts.
- c) All configuration is done through a user-friendly Windows-based program. You can set the volume and what each of eight optically isolated inputs do. Switch inputs can be used to ramp audio to preset levels, select and play specific sounds or select sounds from a preset list or randomizer.
- d) Mounts stand alone, in 2-3/4" Augat Snap Track, or on DIN rail (with adapters).
- e) Runs on any voltage from 12 to 24 vdc. Use 24 vdc for maximum output if using onboard amp.



### Features of the Sd-50/8 and Sd-50/40 include:

Adds eight (Sd-50/8) or forty (Sd-50/40) digital (on/off) Show Control outputs to a Sd-50. Eight of the outputs can be used for controlling eight model airplane-style PCM ServoMotors or used as inputs.

Optional GPS clock for triggering using a 365 day schedule or by location. Locations where sounds and shows are played are set using Google Earth. The angle of view sets direction of trigger.

DMX-512 inputs for controlling Animation & Audio. DMX-512 outputs for up to 512 channels.

Automatic ‘program in place’ download through your PC’s serial port or the Sd flash card. Draw the sequence you need on your computer using our easy-to-use Pc•MACs software, or with ‘Hardwareless RealTime’ mode, program using the PC’s mouse, keyboard and joystick. Pc•MACs will remember exactly what you do and precisely when you did it. Once programmed, the PC can then go away.

Four (optionally eight) MBytes of nonvolatile Show Control memory. Using all forty Sd-50/40 Show Control outputs, this gives a show capacity of about eight hours at thirty updates per second! About 40 hours for the Sd-50/8! Once downloaded, show data is retained for approximately forty years, with or without power applied. Up to 255 individual shows can be loaded onto a Sd-50/8 or Sd-50/40 at one time.

Networkable! Four optoisolated inputs can be used to start, stop, pause, continue, or access shows. They can also be controlled through the RS-232 or networked RS-422 serial ports, MIDI, or IR Triggers.

Show Control outputs are each rated for 150 ma. continuous, or 500 ma. peak. This can drive small solenoid valves, relays, LEDs, lights and other similar loads. Use solid state relays for larger loads or higher voltages (DRV-03, SSR-FS, LC-8SP). A Br-ANA or Digital to Analog converters (DAC-08 or DAC-Quad) can be used if you need analog control signals.

#### 4) Br-ANA:

The Br-ANA is used when you need to control anything that needs a 0-10 vdc analog control voltage. These include animated shows, lighting, motion base simulators, pneumatic and hydraulic systems, special effects, signs, fountains, and more.

A Digital device is either on or off, like a light switch. An Analog device is on, off, or at any point between. A common example of an analog device is a lamp dimmer. In animation, analog movements give the fluid, lifelike movements needed to bring an animated figure to life.

#### Features of the Br-ANA include:

- a) Sixteen 0-10 vdc outputs with eight or twelve bits of resolution.
- b) Outputs are oversampled to 120 Hz, no matter what the data input rate is. This makes the outputs smooth enough to run even the largest motion bases.
- c) Analog endpoints can be adjusted anywhere within the 0-10 vdc range, and even reversed.
- d) Stores and transmits up to 512 channels of DMX-512 data.
- e) Accepts DMX-512 or serial RealTime data from a Pc•MACs system during programming. Can be used as a part of a permanent Pc•MACs system. Error checking prevents glitches from bad data.
- f) Operates as a ‘Smart’ Brick or ‘Dumb’ Brick. Use ‘Smart’ Brick Mode when you are using a ‘Smart’ Brick Brain as a time code reader to synchronize with an external source of time code (LaserDisc, DVD, Smpte, etc.). Use ‘Dumb’ Brick mode when you just need it to trigger and play a prerecorded show.
- g) Sd/SdHC Flash card for a virtually unlimited show capacity. Up to 255 shows can be loaded onto a Br-ANA at one time.
- h) Indicator LEDs for outputs, Heartbeat, DMX-512 and Brick Net status, Sd Flash card read and write, J8 inputs and errors on front of card.
- i) Networkable! In ‘Dumb’ Brick mode, four optoisolated inputs can be used to start, stop, pause, continue, or access shows. Can be controlled and Configured through the networked RS-422 port.

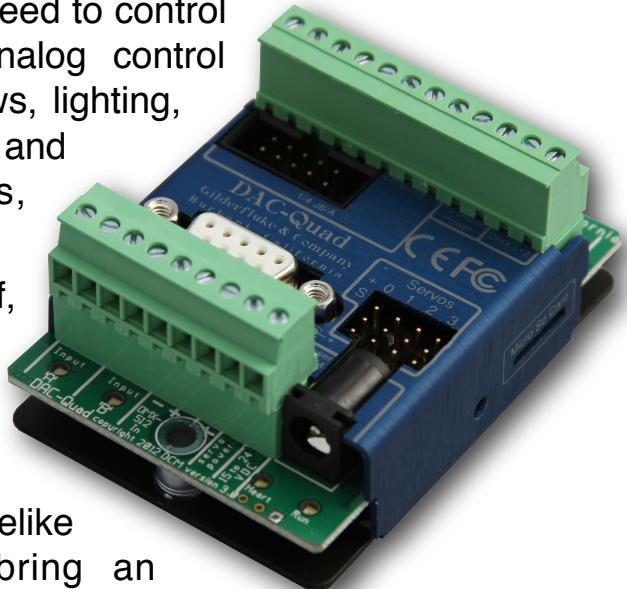


- j) Cards can be mounted in ‘inaccessible’ locations since they are adjusted through the serial port.
- k) Analog outputs are compatible with most Variable Frequency Drives (VFDs) and intelligent motor controllers, EFB-QUAD, PID-QUAD, AMP-Bipolar, etc..
- l) Fits any ‘Brick’ card cage. These are available with from one to sixteen slots, rack mounted or not.
- m) Z-Brick output allows up to sixty-four Z-Bricks. Each Z-Brick adds thirty-two digital outputs.
- n) Runs on any voltage from 17 to 24 vdc.

## 5) DAC-Quad:

The DAC-Quad is used when you need to control anything that needs a 0-10 vdc analog control voltage. These include animated shows, lighting, motion base simulators, pneumatic and hydraulic systems, special effects, signs, fountains, and more.

A Digital device is either on or off, like a light switch. An Analog device is on, off, or at any point between. A common example of an analog device is a lamp dimmer. In animation, analog movements give the fluid, lifelike movements that are needed to bring an animated figure to life. Analog movements can be moved as quickly or slowly as you desire, and stopped at any point within their range of movement.



### Features of the DAC-Quad include:

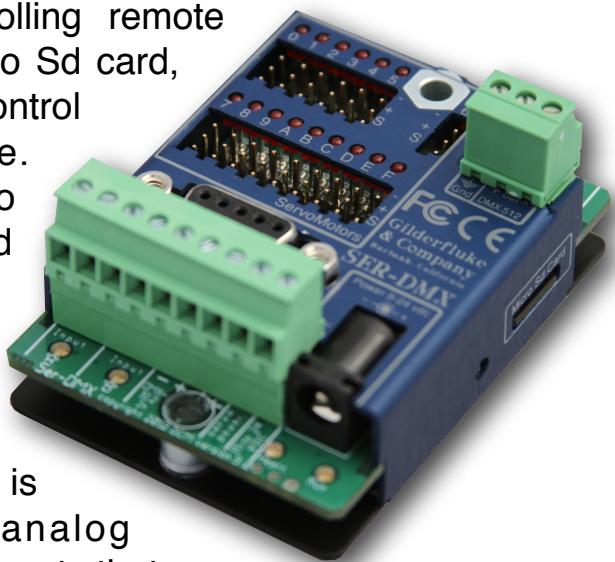
- a) The DAC-Quad controls four 0-10 vdc outputs or four PCM outputs for controlling model airplane-style servomotors. These mirror the analog outputs. Analog outputs are oversampled to four times the incoming frame rate using a 16 bit DAC. This makes the outputs smooth enough to run a large motion base. Analog endpoints can be set anywhere within the 0-10 vdc range, or even reversed. Each ServoMotor output can be adjusted anywhere between .5 and 2.5 milliseconds to give you more than 90° ServoMotor rotation.

- b) Accepts eight or twelve bit resolution commands from your Pc•MACs Animation Programming System.
- c) Built-in Ease-In when shows or DMX-512 starts or stops. These keep the outputs from jumping.
- d) Networkable! The DAC-Quad can act as a ‘master’, sending up to 512 channels of DMX-512 data to other GilderGear and DMX-512-compatible equipment that act as a ‘slaves’, or the DAC-Quad can receive DMX-512 from an external source, and itself be a ‘slave’. Error checking prevents any updates from bad DMX-512 data. As a ‘Master’, the DAC-Quad has the DMX-512 output capacity to run most shows.
- e) Micro Sd Flash card for a virtually unlimited show capacity. Up to 255 shows can be loaded onto a DAC-Quad at one time. In many installations, the DAC-Quad can take the place of a lighting board.
- f) Indicator LEDs for heartbeat, trigger inputs and analog outputs.
- g) Two optoisolated inputs or the RS-232 serial port can be used to start, stop, or access shows.
- h) The DAC-Quad cards can be mounted in ‘inaccessible’ locations, since they are configured through the RS-232 serial port. Hang a wire where you can get to it, or use a Bt-Rs232Rx for wireless Bluetooth.
- i) Analog outputs are compatible with most Variable Frequency Drives (VFDs) and intelligent motor controllers, EFB-QUAD, PID-QUAD, AMP-Bipolar, etc..
- j) The DAC-Quad runs on 15 to 24 vdc. If not using the analog outputs, a lower 7-24 vdc can be used.
- k) Identical in size and shape to a Br-miniBrick8. Can be mounted on snap-track, DIN rail (using the optional DIN-Adapt clips), or just screw or velcro it to the backside of whatever it is controlling.

## 6) SER-DMX:

The SER-DMX is used for controlling remote control-style ServoMotors from its micro Sd card, or from any Gilderfluke Animation Control System or other DMX-512 source. ServoMotors are an inexpensive way to add analog movements to animated figures.

A Digital device is either on or off, like a light switch. An Analog device is on, off, or at any point between. A common example of an analog device is a lamp dimmer. In animation, analog movements give the fluid, lifelike movements that are needed to bring an animated figure to life. Analog movements can be moved as quickly or slowly as you desire, and stopped at any point within their range of movement.



### Features of the SER-DMX include:

- a) The SER-DMX controls up to sixteen remote control-style ServoMotors. These use a Pulse Code Modulated (PCM) command signal with pulses that typically vary between 1.0 and 2.0 milliseconds to give you a 90° ServoMotor shaft rotation. Each ServoMotor output can be adjusted anywhere between .5 and 2.5 milliseconds, or even reversed. Depending on your ServoMotor, this can give you up to 180 degrees of movement. The ServoMotor endpoints do not interact during adjustment.
- b) Accepts eight or twelve bit resolution commands from your Pc•MACs Animation Programming System.
- c) Built-in Ease-In when shows or DMX-512 starts or stops. These keep the ServoMotors from jumping.
- d) Networkable! The SER-DMX can act as a ‘master’, sending up to 512 channels of DMX-512 data to other GilderGear and DMX-512-compatible equipment that act as a ‘slaves’, or the SER-DMX can receive DMX-512 from an external source, and itself be a ‘slave’. Error checking prevents any updates from bad DMX-512 data. As a ‘Master’, the SER-DMX has the DMX-512 output capacity to run most shows.

- e) Micro Sd Flash card for a virtually unlimited show capacity. Up to 255 shows can be loaded onto a SER-DMX at one time. In many installations, the SER-DMX can take the place of a lighting board.
- f) Indicator LEDs for heartbeat, trigger inputs, ServoMotor outputs, and DMX-512 status.
- g) Two optoisolated inputs or the RS-232 serial port can be used to start, stop, or access shows.
- h) The SER-DMX cards can be mounted in ‘inaccessible’ locations, since they are configured through the RS-232 serial port. Hang a wire where you can get to it, or use a Bt-Rs232Rx for wireless Bluetooth.
- i) The SER-DMX runs on 7 to 24 vdc. ServoMotors typically use 4 to 6 volts. Some ServoMotors use up to 12 or 24 vdc. If using ServoMotors that need more than seven volts, you can run the SER-DMX from the same supply as the ServoMotors.
- j) Identical in size and shape to a Br-miniBrick8. Can be mounted on snap-track, DIN rail (using the optional DIN-Adapt clips), or just screw or velcro it to the backside of whatever it is controlling.

## 7) Pb-DMX/nn:

The Pb-DMX/0 plugs right onto PB-8, Pb-16, Pb-24, or PB-32 relay modules. The Pb-DMX/xx receives DMX-512 data, RealTime serial data through its RS-232 serial port, or show data from its onboard data storage to control up to thirty-two AC or DC output relays. Using DMX-512, 4096 relays can be controlled using a single pair of wires!

To program the Pb-DMX/xx’s onboard memory, you can draw the sequence you need on the screen of your computer using our included Pc-MACs software. You can also program in RealTime using the PC’s mouse, keyboard and (optionally) a Joystick or other console. Pc-MACs will remember exactly what you do and precisely when you did it. When you have all your shows completed, you can send



them to the Pb-DMX/xx through the serial port. The PC can then go away. The Pb-DMX/xx will run by itself.

### Features of the Pb-DMX/xx include:

- a) Plugs onto a Grayhill 8, 16, 24, or 32 position ‘G5’ relay mounting boards.
- b) Accepts standard DMX-512 data so it can be used as ‘slave’ to a larger control system. Address is set through serial port.
- c) Outputs 64 channels of standard DMX-512. It can be used as a ‘master’, controlling other Pb-DMXs (or light dimmers, wiggle lights, strobe lights, anything else that will accept DMX-512).
- d) Programming and operation are identical to a Br-miniBrick8, but with 32 outputs!
- e) Automatic ‘program in place’ download through the RS-232 serial port on your PC and the included Pc•MACs software. It takes about thirty seconds to download a ten minute show.
- f) RS-232 port is connected using a 1/8” mini plug. Serial cables are available from Gilderfluke & Co. as the Mp3-50/CBL. If your PC does not have a serial port on it, we also offer the [USB-RS232/422](#) adapter and lower cost c-USB-RS232 adapter.
- g) ‘Test’ button allows outputs to be manually turned on one at a time.
- h) Each Pb-DMX/xx has a show capacity of about 9-½ hours at thirty updates per second! Once programmed, shows are saved for approximately forty years, with or without power applied. Supports up to 255 shows.
- i) Two optoisolated inputs are used to trigger from push buttons, motion sensors, or any other type of switch.
- j) Runs on anything from seven to twenty-four vdc. Use five volt modules for supply voltages up to nine volts. Use 15 volt modules with supply voltages from 11 to 21 volts. Use 24 volt modules for supply voltages from 18 to 32 volts.
- k) AC and DC relay output modules are available. Typical current capacity is 3.5 amps each. You can freely mix both AC and DC relay output modules on any PB-nn mounting board.

## 8) Br-ZBR:

The Z-Brick is a complete thirty-two digital output Show Control System. The Z-Brick runs standalone, or as a ‘master’ or a ‘slave’ on a DMX-512 network. When running standalone or as a DMX-512 ‘master’, it is just like a big Br-MiniBrick8, with four times the outputs and virtually unlimited memory capacity. It accepts data through its RS-422 or DMX-512 ports for RealTime programming, and stores shows on standard Sd/SdHC flash cards.

To program the Z-Brick, you can draw the sequence you need on your computer using our Pc•MACs software. For smaller shows, or by using the optional ‘RealTime’ license for larger shows (shows with more than four Z-Bricks), you can program using your PC’s mouse, keyboard and joystick. Pc•MACs will remember exactly what you do and precisely when you did it. When your shows are completed, they can be sent to the Z-Brick through the serial port, or you can drag-n-drop the completed files onto a standard Sd or SdHC flash card, and insert it in the front of the Z-Brick. The PC can then go away and the Z-Brick can run by itself.



### Features of the Z-Brick include:

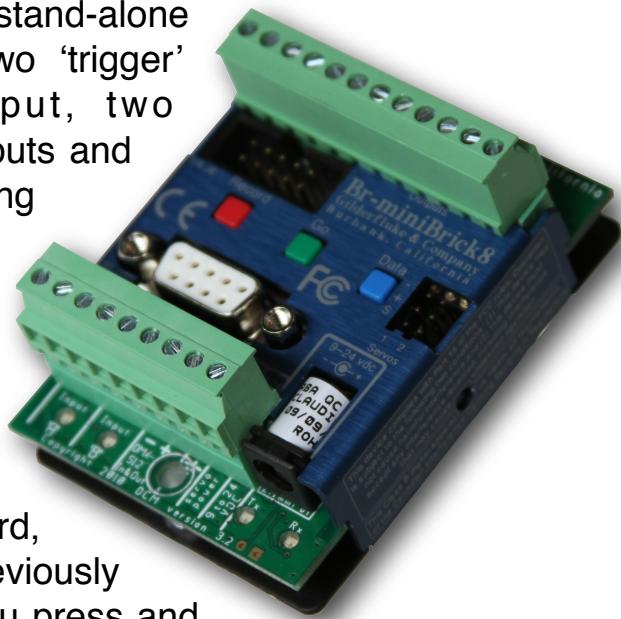
- a) The 32 digital (on/off) outputs are rated for 150 ma. continuous, or 500 ma. peak. These can drive small solenoid valves, relays, LEDs and similar devices. Outputs are protected against most short-circuits.
- b) Shows are stored on standard Sd/SdHC Flash cards for a virtually unlimited capacity (up to 32 GBytes). The Sd card’s ‘Write Protect’ switch can protect show data from accidental changes. Like all GilderGear, up to two hundred fifty-five shows can be loaded onto a Z-Brick at one time.
- c) The Z-Brick supports update rates from one frame per second to a maximum of one hundred frames per second. Different shows can each be programmed at different frame rates.
- d) Networkable! Transmits a full 512 channel DMX-512 universe to act as a network ‘master’, or receives a full 512 channel DMX-512 universe to use as a ‘slave’.

- e) Triggerable! Four optoisolated inputs or the RS-422 serial port can be used to start, stop, pause, continue, or access shows. Rising or falling edges can trigger different actions. Supports both random and sequential playlist commands.
- f) Fits any ‘Brick’ card cage. These are available with one to sixteen slots, rack mounted or freestanding.
- g) The Z-Brick runs on any voltage from nine to twenty-four vdc.

## 9) Br-miniBrick8 :

The Br-miniBrick8 is a complete stand-alone Show Control System. It features two ‘trigger’ inputs, DMX-512 input or output, two airplane-style servo motor control outputs and eight high current outputs for driving solenoids, lights and relays.

You can program the digital outputs without a computer. Press and hold the red ‘Record’ button until the first output flashes. Press again to step to the output you want to record. When you are ready to record, tap the green ‘Go’ button. Any previously recorded data will play back. While you press and hold the ‘Record’ button, anything you do on the blue ‘Data’ button is recorded on this one output while the other outputs continue to play back. The Br-miniBrick8 will remember exactly what you do and precisely when you did it. You repeat this until you have all eight outputs programmed just the way you want them.



To program the Br-miniBrick8 using a computer, you can draw the sequence you need on the screen of your computer using our included Pc•MACs software. You can also program in RealTime using the PC’s mouse, keyboard and (optionally) a Joystick or other console. Pc•MACs will remember exactly what you do and precisely when you did it. When you have all your shows completed, you can send them to the Br-miniBrick8 through the serial port. The PC can then go away. The Br-miniBrick8 will run by itself.

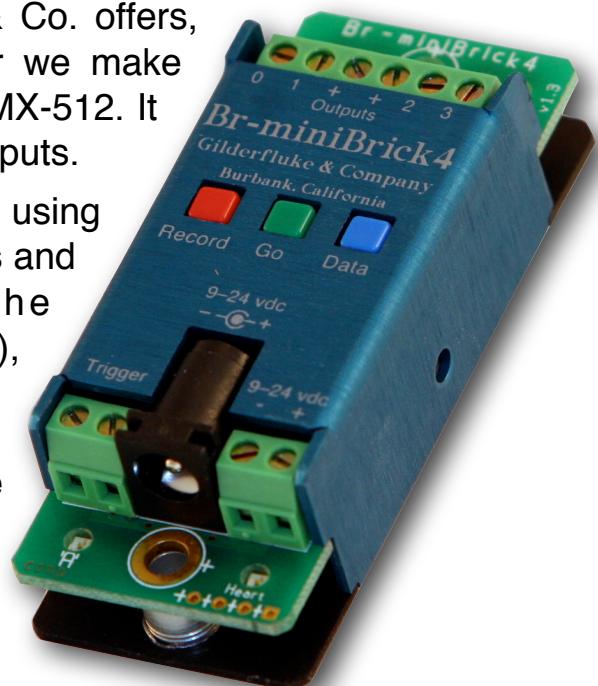
## Features of the Br-miniBrick8 include:

- a) Automatic 'program in place' download through the standard serial port on your PC and the included Pc•MACs software. It takes about twenty seconds to download a fifteen minute show.
- b) Each Br-miniBrick8 has a single channel show capacity of over thirty-six minutes at thirty updates per second! Once programmed, shows are saved for approximately forty years, with or without power applied.
- c) Two optoisolated inputs are used to trigger from push buttons, motion sensors, or any other type of switch.
- d) Supports up to 255 shows at a time (from serial). You can loop a single show or build 'chains' of shows.
- e) Each of the four outputs is rated for a continuous load of 150 ma., or 500 ma. peak at 24 vdc. This is enough to drive small solenoid valves, relays, lights, and similar loads. The LEDs show all output activity.
- f) Runs on anything from nine to 24 vdc, including batteries. Mounts in 2.75" 'Snap Track' or on standoffs.

## 10) Br-miniBrick4:

The smallest controller Gilderfluke & Co. offers, the Br-miniBrick4 is the only controller we make which can neither transmit or receive DMX-512. It has one trigger input, and four digital outputs.

You can program the Br-miniBrick4 using the buttons on its top, or using Pc•MACs and the Ser-Adapt2 (which gives the Br-miniBrick4 a temporary serial port), but it will never be used as either a DMX-512 'Master' or 'Slave'. The Br-miniBrick4 is a complete stand-alone Show Control System. It features a single 'trigger' input, and four high current outputs for driving solenoids, lights and relays.



## Features of the Br-miniBrick4 include:

- a) Each Br-miniBrick4 has a show capacity of over four minutes at thirty updates per second! Once programmed, shows are retained for approximately forty years, with or without power applied.

- b) One isolated input is used to trigger from push buttons, motion sensors, or any other kind of switch.
- c) Each of the four outputs is rated for a continuous load of 250 ma., or one amp peak at 24 vdc. This is enough to drive small solenoid valves, relays, lights, and similar loads. The LEDs show all output activity.
- d) High quality cage clamp-style screw terminals for all power, trigger, and output connections.
- e) Runs on anything from 9 to 24 vdc, including batteries or solar cells.
- f) Sturdy metal case mounts in 2.75" 'Snap Track', with Velcro, double face tape or a pair of screws.

## GilderGear for DMX-512 ‘Rx Only’:

The vast majority of the controllers made by Gilderfluke & Co. can store and playback shows from either built-in or removable flash memory. The few controllers which don’t have this ability include:

### 1) v-Hd-to-DMX:

BrightSign players are solid state video players. A number of different models are available, with either full 1080p Hd or UHD 4K resolution video outputs. The **v-HD-to-DMX** is used to trigger video playback on a BrightSign player from any source of DMX-512. The DMX-512 can come from Pc•MACs, an existing light board or another piece of GilderGear. Since it is triggered by the same DMX-512 as everything else in the theater, everything will always be in sync.



Anyone who can run a light board can use the **v-HD-to-DMX**, GilderScript and a BrightSign player to add audio, video and still image playback to a presentation. The GilderScript allows you to use most standard media files on a BrightSign player without any manual ‘scripting’. Just drop your media files into appropriately named folders on a standard Sd (or SdHC or SdXC) flash memory card and shove it into the BrightSign player. If you send a value of ‘123’ to the DMX-512 address of the **v-HD-to-DMX**, any file(s) you have placed in a folder named ‘playlist123’ will be played.

### Features of the v-HD-to-DMX include:

- a) Plugs into and is powered by any BrightSign player with a 15 pin GPIO port.
- b) The GilderScript allows you to have up to 255 ‘playlist’ folders on each BrightSign player. Each playlist folder can hold one or more media files. If more than one media file is in a playlist folder, you can select whether files will be played sequentially or in random order each time the playlist is cued. The files can also be set for ‘steppable’ (interruptible) or ‘non-steppable’ (non-interruptible) playback.

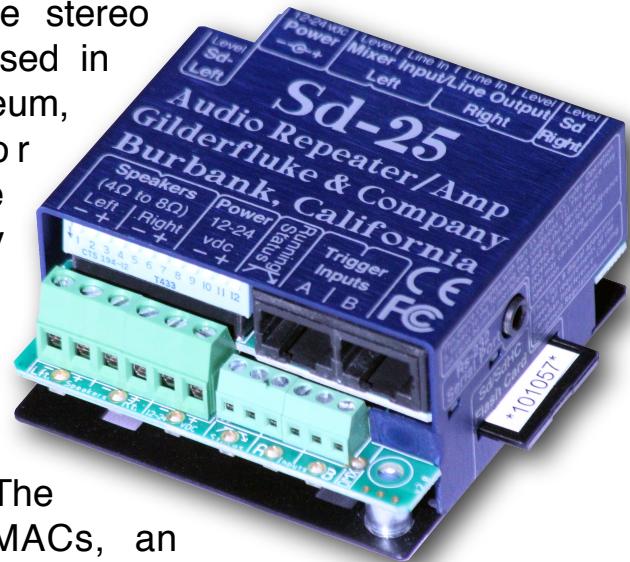
- c) If you need audio and video to be played between your triggered media, just drop your file(s) into a folder named 'Background Loop'. Anything that is found in that folder will be played on initial power-up, and whenever there is no triggered video file playing.
- d) The DMX-512 connection is galvanically isolated. This eliminates the possibility of ground loops and other noise problems in installations with many BrightSign video players. The high impedance DMX-512 input allows up to 256 **v-HD-to-DMXs** on a single DMX-512 line.
- e) Occupies just a single DMX-512 'dimmer' address, or optionally can be addressed on eight consecutive DMX-512 addresses to appear on your lighting board as eight 'relay' outputs (each output turns on above 50%)<sup>5</sup>.
- f) Two Rj-45 connectors for DMX-512 in and out makes it easy to daisy chain players. Uses standard USITT recommended DMX-512 pinout and off-the-shelf CAT-5 Ethernet cables and connectors.
- g) Three rotary dipswitches for setting the DMX-512 base address for the **v-HD-to-DMX**. Supports both 'zero-based' (0-511) or 'one-based' (1-512) addressing (selected by a dipswitch).
- h) If receiving DMX-512 from any GilderGear, it will sense the presence of [GilderCheckSums](#), and automatically use them. [GilderCheckSums](#) keep the **v-HD-to-DMX** from updating on corrupted data packets.

## 2) Sd-25 w/DMX:

The Sd-25 w/DMX is a complete stereo audio playback system. It can be used in Store-Casting, Music-On-Hold, Museum, Safety, Haunt, Industrial or Entertainment applications. Anywhere you need a solid state, high quality audio system that will play for years.

### Features of the Sd-25 w/DMX include:

- a) DMX-512 input can be used to select and play 255 SoundFiles using just one DMX-512 channel. The DMX-512 can come from Pc•MACs, an



<sup>5</sup> This feature is for using the v-HD-to-DMX with lighting boards that can't individually control all eight bits in a single byte of DMX-512 data.

existing light board or another piece of GilderGear. Using two addresses, you also get live volume control via DMX-512. Two RJ-45 jacks to make networking easy.

- b) RS-232 and IR ports, which were options on the earlier Sd-25s, are now standard on the Sd-25 w/DMX.
- c) Stand alone stereo playback of standard Mp3 (all data rates) or AudioFile/VideoFiles (up to 48K/16 bit) stored on standard Secure Digital (Sd or SdHC) cards. Up to 255 Files in most modes, 32,737 in some.
- d) Use an Apple remote to play sounds and adjust volume levels. Use IR-Tx's for ride vehicle audio triggers.
- e) An amazing 50 Watt Class-D stereo amplifier packs the power of most 200-250 Watt linear amps! It draws only a fraction of the power of a typical amplifier, and only when it is pumping sound. Works with most 8 ohm speakers. The amplifier can be bridged for 50 watt mono output into a 4 ohm load.
- f) Two RCA jacks for input or output of line level audio signals. Works with external amps or audio sources.
- g) All configuration is through externally accessible switches. No PC software or drivers are ever needed.
- h) LEDs show triggers, DMX-512, heart and Sd card activity. Modulation LEDs show audio as it is played.
- i) Two non-polarized optically isolated triggers. Attaches to PLCs, switches, motion detectors, IR sensors, alarm systems or other controllers. Inputs can be set to ramp audio or to select and play specific sounds round-robin or randomly. StoreCasting and Music-On-Hold modes can play an announcement between each music track. Triggered SoundFiles can be set to accept or ignore additional requests once started.
- j) Mounts in Snap Track, DIN rail (optional), or just Velcro or screw it down. Mounts nicely in a 4x4 J-Box.
- k) Optically isolated 'running' relay output can be used to turn on lights, relays, audio ducking, etc..
- l) Built in RS-232 serial port can be used to control volume, call up sounds and monitor the Sd-25 w/DMX.

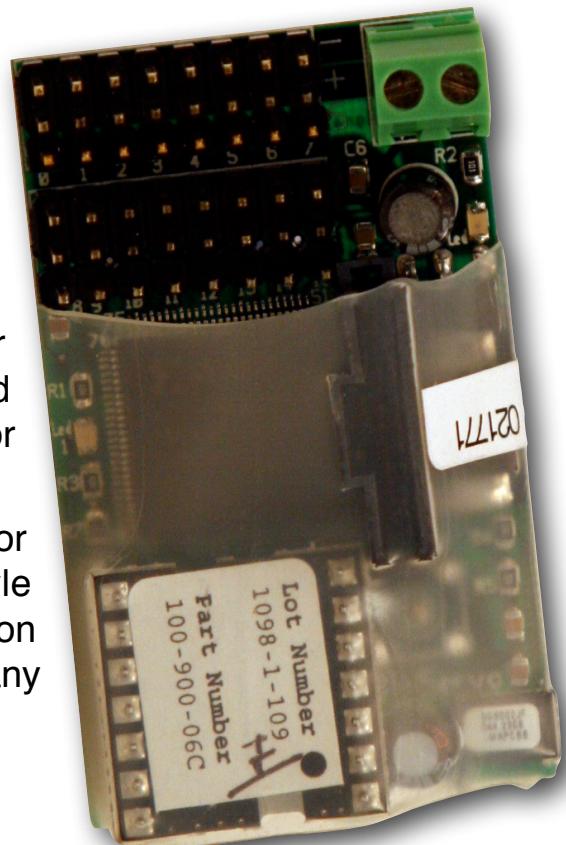
- m) Runs on any voltage from 12 to 24 vdc. Draws 2.5 Amps at 24 volts (50 Watts) at max amplifier output.
- n) Low current draw makes the Sd-25 w/DMX ideal for batteries or solar cells where power is unavailable.
- o) A 'Starter Kit' is available: Includes a USB flash card reader/writer, 24 vdc power supply, Sd card, etc..

### 3) Bt-Servo:

The Bt-DMX and Bt-Servo are used for wireless control of remote control-style ServoMotors from a Pc•MACs Animation Control System, Br-Brain4, Sd-50 or any other source of DMX-512 data.

The Bt-DMX and Bt-Servo use a bidirectional 900 MHz link. You can wirelessly configure the Bt-Servo cards, or check on temperature, battery levels and the Bt-Servo card status from any PC or Mac.

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The Bt-DMX and Bt-Servo use a bidirectional 900 MHz link. You can wirelessly configure the Bt-Servo cards, or check on temperature, battery levels and the Bt-Servo card status from any PC or Mac.

### Features of the Bt-DMX include:

- a) Configured through USB serial port from any PC or Mac. Once talking to
- b) BT-DMX, you can talk wirelessly to the Bt-Servo cards to configure them.
- c) 900 MHz frequency band. 49 software selectable, non-interfering channels.
- d) Five pin XLR for DMX-512 input.
- e) Each Bt-DMX transmits data for up to 128 ServoMotors.
- f) Range of up to 500 feet outdoors.
- g) Nine indicator LEDs show data updates, power, configuration status, etc..
- h) 3.1" x 4.5" x 1.7". Small enough to be placed close to the set.
- i) Includes 12 vdc power supply.

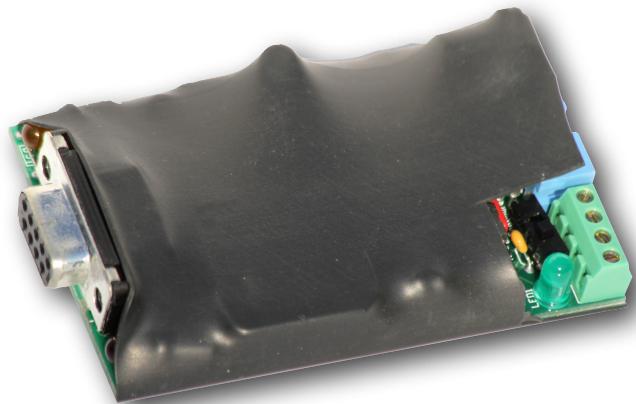
### Features of the Bt-Servo include:

- a) Control up to sixteen remote control-style ServoMotors from each Bt-Servo.
- b) Accepts eight or twelve bit resolution position commands. ServoMotor positions are oversampled and calculated in sixteen bits for smoothness.
- c) Automatic Ease-In when DMX-512 or RF update signals start or stop.
- d) 900 MHz frequency band. 49 software selectable, non-interfering channels.
- e) Up to 128 servos (at 8 bits of resolution) on each frequency spread across eight or more Bt-Servo cards. Up to 85 servos per frequency at 12 bits.
- f) Each ServoMotor's ends of travel can be set anywhere between .759 and 2.241 milliseconds. Endpoints do not interact during adjustment.

- g) All settings are stored in nonvolatile memory.
- h) Two indicator LEDs show data updates, errors in received data, etc..
- i) Runs from 5 to 12 vdc servo power. Automatic servo shutoff if voltage drops below a user-preset level, or when Rf updates are not received.
- j) 2.025" tall x 1.025" wide x .425" thick. About the size as a 9 volt battery!

#### 4) Br-SDC9:

The Br-SDC/09 is a complete, stand-alone Serial Output Controller. It is used whenever you need to control any device that needs strings of RS-232 serial data (RS-422 optional). It can be used to with almost any serial controlled device. The Br-SDC/09s can be controlled from Gilderfluke & Co.'s Show Control Systems, PLCs or any other control systems. Just attach some buttons, and you can make your own interactive video kiosk.



The Br-SDC/09 can be set to send out strings on power up or in response to any of its ten optoisolated inputs. Different actions can be taken on the opening or closing edges of any inputs. The Br-SDC/09 can then branch to a different serial string or completely different 'show' if the response to the string is correct or in error.

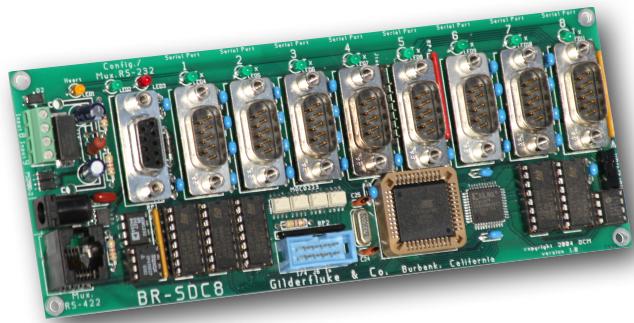
#### Features of the Br-SDC/09 include:

- a) Fifteen different serial strings of up to 127 characters each.
- b) Plug it into the serial port on a PC to configure.
- c) 'Write Protect' switch protects against accidental configuration changes.
- d) Ten optoisolated inputs to synchronize Br-SDC/09s with pushbuttons, realtime events and other control systems. Two of the inputs use screw terminals. The other eight use a standard 1/4 J6 connector. These can be used in 'binary' mode to connect a binary coded keypad.
- e) Different actions can take place on opening and closing edges of inputs.
- f) Strings can include 'delays' of one frame to over nine hours.

- g) The Br-SDC/09 can send a different string, or play a different show if any string gets an incorrect serial response from the device it is controlling.
- h) Built in commands for Pioneer LaserDisc & DVD players, or Sony LaserDiscs.
- i) Supports both CAV (thirty minute) and CLV (one hour) LaserDiscs.
- j) The Br-SDC/09 comes with DE-09 female for general purpose use.
- k) The Br-SDC/15 comes with DB-15 male for Pioneer LaserDiscs and DVDs.
- l) The Br-SDC8 runs on anything from nine to twenty-four vdc. It includes a small universal input 'wallwart' power supply.
- m) Br-SDC/09s are often mounted by their connectors or by the Velcro on their backs. Typically they are mounted right on whatever they are controlling.

## 5) Br-SDC8:

The Br-SDC is a complete, stand-alone Serial Output Controller. The Br-SDC8 adds eight multiplexed RS-232 serial ports. It is used whenever you need to control eight devices that need strings of RS-232 serial data. It can be used to with nearly any RS-232 serial controlled devices. The Br-SDC8 can be controlled from Gilderfluke & Co.'s Show Control Systems, PLCs or any other control systems. Just attach some buttons, and you can make your own interactive video kiosk.



The Br-SDC8 can be set to send strings on power up or in response to any of its ten optoisolated inputs. Different actions can be taken on the opening or closing edges of any inputs. The Br-SDC8 can then branch to a different serial string or 'show' in response to the string.

### Features of the Br-SDC8 include:

- A) Expands a Br-Brain4's one RS-422 serial port to eight RS-232 serial ports.
- B) Fifteen different serial strings of up to 127 characters each.

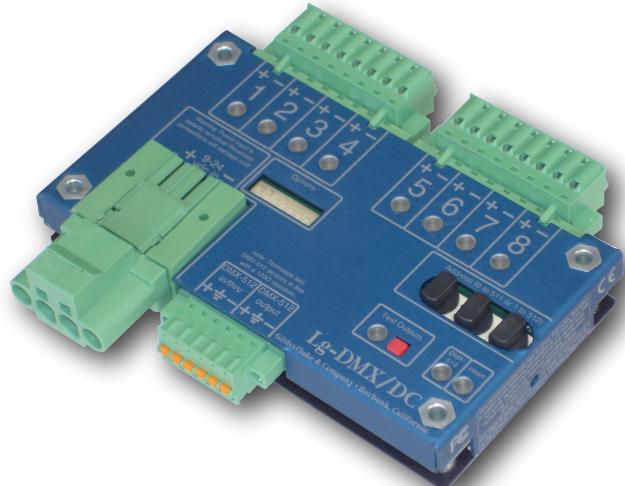
- C) Plug it into the RS-232 serial port on a PC to configure.
- D) 'Write Protect' switch protects against accidental configuration changes.
- E) Ten optoisolated inputs to synchronize Br-SDC8s with pushbuttons, realtime events and other control systems. Two of the inputs use screw terminals. The other eight use a standard 1/4 J6 connector. These can be used in 'binary' mode to connect a binary coded keypad.
- F) Different actions can take place on opening and closing edges of inputs.
- G) Strings can include 'delays' of one frame to over nine hours.
- H) The Br-SDC8 can send a different string, or play a different show if any string gets an incorrect serial response from the device it is controlling.
- I) Built in commands for Pioneer LaserDisc & DVD players, or Sony LaserDiscs.
- J) Also acts as single RS-232/422 to eight RS-232 serial port multiplexer.
- K) Uses 'AT+++' commands to switch which ports are routed in and out.
- L) The Br-SDC8 runs on anything from nine to twenty-four vdc.
- M) Mount Br-SDC8s by screw standoffs, or in 2-3/4" Augat 'Snap Track'.

## 6) Lg-DMX/DC:

This is an eight channel Direct Current (DC) dimmer pack.

### Features of the Br-SDC/09 include:

- a) Outputs are rated for 5-10 amps, at up to 24 vdc..
- b) DMX is set with a simple three position rotary switch. Just dial in the address you want to use.
- c) Options are set using the eight position dipswitch.
- d) Built tough enough to be used on rollercoasters and other environments with almost constant vibration and high G forces.



## Pc•MACs QuickStarts

This section is designed to give you a quick overview of the Pc•MACs software. It is designed to give a new user a paragraph or two of instructions in using some of the major features of Pc•MACs. The videos on the GilderYouTube are the video equivalent to this 'Quickstart' section of the manual.

Many more commands and details on the following commands can be found in other sections of this manual.

### Install the Software.....

*If the Pc•MACs software has already been installed on the computer you are using, you can skip this step.*

Pc•MACs is usually distributed on a DVD or CD, downloaded from our web page, or received as a file attached to an Email. If you have the DVD or CD, just insert it in the appropriate receptacle in your computer. The CD will bring up a menu which will allow you to install Pc•MACs and other Gilderluke & Co. software. All Gilderluke & Co.'s manuals and training videos are also on this disk. The manuals can be read using the included Acrobat PDF reader.

If you have received the Pc•MACs software via an Email, it will probably be compressed into a '.zip' file. You will first need to decompress this file. Your browser or Email program may do this for you automatically. If not, you will need a program like unzip.exe or Win Zip to decompress them. Once this is done, just run the 'Setup.exe' program and follow the steps as it installs Pc•MACs on your computer.

To download the Pc•MACs software from our website, it looks like you are making a purchase, but there is no charge for downloading our software. From our web page, just go to the 'Software/Drivers' page. Add the software you want to download to your cart. Click on the 'Checkout' button. Fill in your name, email, etc.. When it asks for the shipping method, choose 'download'. When you complete your 'purchase', the software you selected will be downloaded to you. After it completes, you will find the Pc•MACs installer in whatever folder your browser uses for 'downloads'. Just run the 'Setup.exe' program and follow the steps as it installs Pc•MACs on your computer.

When the Pc•MACs 'Setup.exe' program is run, it will install the 32 or 64 bit version of Pc•MACs on your computer.

## Getting started.....

*If the Pc•MACs software is already running on the computer you are using, you can skip this step.*

By default, the installation process will have left a shortcut to Pc•MACs under the Windows Start/Programs/Gilderfluke pulldown and/or on the desktop of your computer. You can start Pc•MACs by double clicking on either of these aliases, or navigating directly to the Pc•MACs.exe file and double clicking directly on it. The installation process will have told the Windows registry about Pc•MACs. You can also start Pc•MACs by double clicking on any show (\*.SHO) or site (\*.STE) file.

Without the MACs-License, you will be able to access the vast majority of feature in the Pc•MACs program. The real-time commands (Play, Record, Rehearsal, Single Step, etc.) will be limited to the first sixteen DMX-512 addresses (or 128 digital functions), and you will not be able to use a [USB-DMX512 Adapter](#).

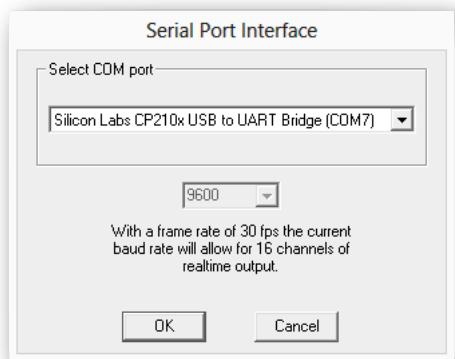
If you have bought the MACs-License, then with the appropriate hardware, you will be able to update up to 10,000 channels worth of outputs.

## Enable the serial port.....

*If a serial port has already been selected, or you aren't going to be downloading to a Pb-DMX/nn, Br-miniBrick4 or Br-miniBrick8 or using RealTlme updates through the serial port, you can skip this step.*

For smaller shows, the serial port is typically used to talk to the GilderGear that controls the system. Actual hardware serial ports are now rare on PCs, so you will probably be using a USB-to-Serial adapter of some sort. Gilderfluke & Co. makes the USB-to-RS232/422, and resell a less expensive c-USB-to-RS232 converter as well.

If this is the first time that you have used Pc•MACs, you will need to select the serial port you are using. You can do this by opening the dialog under the '[Preferences](#)' menu's '[Hardware/Serial Port Interface....](#)'.



Select the serial port you are going to be using. If no serial port is shown in the popup, your serial port may be in use by another application, or Windows is having trouble finding it. Go to the Windows 'Device Manager' and see if your serial port is listed under 'Ports: COM and LPT', and if Windows thinks it is working OK.

If you exit Pc•MACs, when you restart Pc•MACs, it will try to reconnect to the serial port which was used the last time Pc•MACs was used. If Pc•MACs can't find

this serial port, you will need to select the serial port again the next time you use Pc•MACs.

## Enable the MACs-License.....

If you have NOT purchased a MACs-License, or have already installed the [permanent USB key MACs-License](#) or [Temporary Numeric MACs-License](#), you can skip this step.

If you have already purchased the MACs-License, but have not yet received the [permanent USB key](#), you can open the '[Preferences](#)' menu's '[Hardware Setup](#)' / '[Security Key](#)' Dialog. Send us the 'System Serial Number', and we will return a temporary 'Security Key'. Enter this number exactly as received, and press the 'Validate Key' button. If it is recognized, the status will change to 'Enabled'.

If you do have the [permanent USB key MACs-License](#), the drivers should have been installed along with Pc•MACs. Plug the dongle into any available USB port on your computer. When you open the Security Key dialog, it should show 'Hardware Key in Use'.

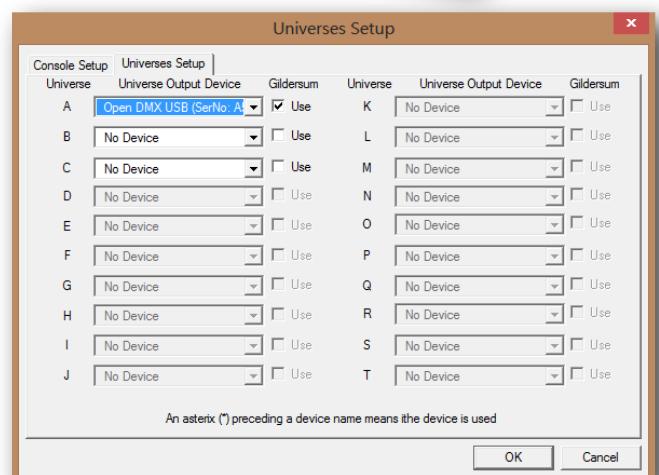


## Enable the USB-DMX adapter.....

If you have NOT purchased a MACs-License, or don't have a [USB-DMX512 Adapter](#), you can skip this step.

The drivers for the USB-toDMX adapter should have been installed along with Pc•MACs. Plug the USB-toDMX adapter into any available USB port on your computer.

To tell Pc•MACs about the [USB-DMX512 Adapter](#), open the '[Preferences](#)' menu's '[Universes](#)' dialog. From the universe 'A' drop down, select the [USB-DMX512 Adapter](#). If you will be talking to GilderGear on this DMX-512 universe, enable the [GilderCheckSums](#).

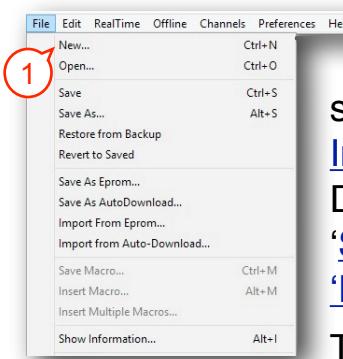


## Starting a New Show in Pc•MACs.....

If you want to use a show that has already been created, just select the '[File](#)' menu's '[Open...](#)' command to select and open an existing show, or use the list of 'recent' shows to select an existing show to open. You can then skip this step.

To start a new Pc•MACs show, just take the following four easy steps:

### 1. Select '[New Show](#)' from under Pc•MACs' '[File](#)' menu:



This will open the '[New](#)' Show Dialog. There aren't too many things that need to be set here, and anything you do set can be changed later by accessing the '[Show Information....](#)' dialog. Except for its name, the '[New](#)' Show Dialog is identical to the '[Show Information....](#)' dialog. The '[Show Information....](#)' dialog is also accessible from under the '[File](#)' menu.

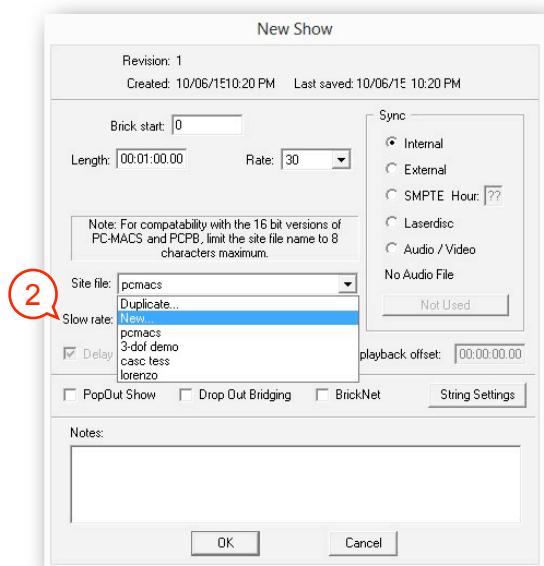
The '[New](#)' Show Dialog is where you can set:

- Show Length (the default is one minute long) You can guess about the length of your show and enter it, but if you will be adding audio or video files to the show, Pc•MACs can automatically do this for you a bit later.
- Site File (*for details on your Site file, see the next step immediately below*).
- Frame Rate (the default is 30 frames per second). Unless you have a compelling reason not to, just leave it at 30 fps.
- Time Code (the default is 'internal'). The most common selections are the default 'Internal', or 'Audio/Video'. Unless you are using 'Smpte', 'LaserDisc/DVD' or 'External', you will normally leave this set to 'internal', and you will later select a SoundFile or VideoFile using the drag-n-drop Audio/Video triggers on the OffLine Editing Window.

With the one exception of the Site File, all the '[New](#)' Show Dialog settings can be freely changed at any time, so don't worry about them too much about getting these perfect <sup>6</sup>. No settings for your shows are chiseled in stone under Pc•MACs. You can change the frame rate, length, time code or anything else from the '[Show Information....](#)' dialog at any time in the future.

<sup>6</sup> If you need to change the frame rate or length of a show, even after the show has been programmed, Pc•MACs can (optionally) interpolate your existing show to the new frame rate or length.

## 2. Select a ‘new’ or existing ‘Site’ file:



The ‘Site’ file is where Pc•MACs stores information about everything Pc•MACs is controlling at a specific ‘site’. This includes types of inputs and outputs, the names you have given them, the console and other presets, what shows were included in any AutoDownloads and much more.

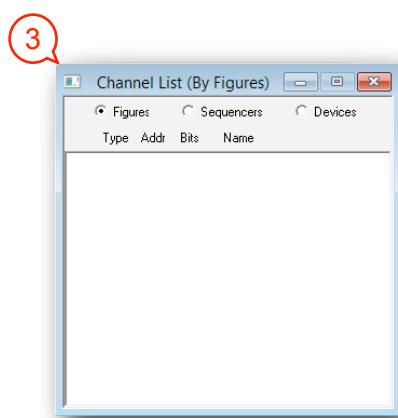
Depending on the type of shows you do, a ‘Site’ could be an attraction at a theme park, a display in a museum, a fountain, or a stand-alone ‘prop’ built by the dozens for the haunt market. No matter what type of shows you are building, each ‘Site’ should have its own uniquely-named ‘Site’ file. You should not use the default

‘PcMACs.ste’ ‘Site’ file for any ‘real’ shows. If you do, you have a good chance of screwing up your shows if you were to use it again on another project.

All the shows that run at a ‘Site’ should always use the same ‘Site’ file. This saves you from reentering the same stuff each time you start a new show. If you modify or add a preset, change the name of an output, or anything else, it will instantly and automatically be applied to all other shows which use the same ‘Site’ file.

To select an existing ‘Site’ file, there is a drop-down that lists every ‘Site’ file name that you have ever used on your computer, or if you scroll to the top of the list, you can enter a ‘New’ site file name or ‘Duplicate’ the current ‘Site’ file.

## 3. Close the ‘[New Show](#)’ dialog / Open the ‘[Channels List](#)’ dialog:



If you are using an existing ‘Site’ file that is already set up, you can skip down to ‘Programming your Show’.

If you are using a new ‘Site’ file for this show, when you close the ‘[New Show](#)’ dialog, the ‘[Channels List](#)’ will automatically open. It will be very empty (see at left). The next step is to fill it in (see next page)...

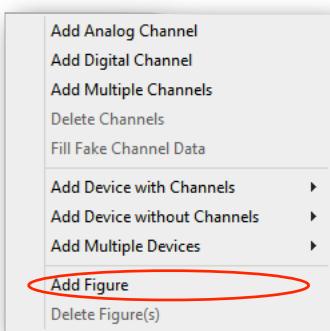
In all the following ‘[Channels List](#)’ commands, you can use the command from the ‘[Channels’ menu](#), or just RightClick in the ‘[Channels List](#)’ and pick the command from the shortcut menu that will magically appear.

#### 4. Select the ‘Add Device with Channels’ command<sup>7</sup>:

Slide over to pick whatever GilderGear and third party hardware you need in your show. Repeat this as needed. If you are adding several of the same items, you can use the ‘Add Multiple Devices’ command as a shortcut.

The DMX-512 address order is determined by the order in which you add devices and channels to the [Channels List](#). Pc•MACs, GilderGear, and other DMX-512 devices don’t really care about the order in which you add them. You will always set the DMX-512 address of any GilderGear or third party gear to match the DMX-512 address shown in the ‘addr’ column on the [Channels List](#).

If you plan on triggering audio, at least one of these devices should be the Sd-25 w/DMX, Sd-50/8 or Sd-50/40. If you are planning on triggering video, at least one of these devices should be the v-Hd-to-DMX, which along with the GilderScript allows BrightSign Video players to be triggered via DMX-512.

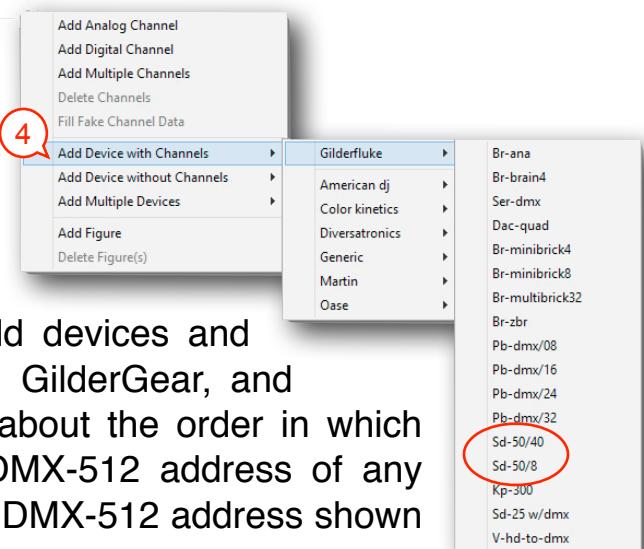


To help you keep your [Channels List](#) orderly, you can use the [‘Channels’ menu’s](#) ‘Add Figure’ or RightClicking in the [Channels List](#) and selecting the ‘Add Figure’ command from the shortcut menu.

‘Figure’ folders are used like a ‘folder’ on your computer. You can put individual output channels, or entire folders into them to organize them and make them easier to manage. Drag and drop individual outputs or entire figures into the ‘Figure’ folders. Folders can be nested several layers deep in

your [Channels List](#).

**Hint:** If you create a figure and highlight it, any analog or digital channels or devices you add will go right into that folder, saving you the trouble of moving them later. If you use the ‘Add Multiple Devices’, Pc•MACs will give you the option



<sup>7</sup> There is a very similar ‘Channels’ menu’s ‘Add Device without Channels...’ directly below this command. The ‘Without Channels’ is a special command which is used to update older shows which already have all the channels they need in the [Channels List](#), but were created before we added the ‘Devices’ options. As the name implies, this command adds the Devices, but does not add any additional outputs to the [Channels List](#).

of automatically creating new ‘Figure’ folders for each device, and putting the channels that are created into these folders.

## Addressing Your DMX-512 Networked Gear.....

Once you have all the gear needed for your show added into the [Channels List](#), you can start addressing any external hardware. Don’t worry if you might need to add, remove or rearrange equipment on the [Channels List](#) later. This can easily be done at any time.

DMX addresses are simply numbers between ‘1’ and ‘512’. If your project needs more than 512 DMX-512 addresses, then it may grow into additional DMX-512 ‘Universes’. Each ‘Universe’ is normally a physically separate network<sup>8</sup>, typically with its own network wire, so the address numbers start over again at ‘1’ through ‘512’. When this happens, Pc•MACs will automatically start appending a ‘Universe Letter’ to each DMX-512 address. Address numbers in the first ‘Universe’ are ‘a1’ through ‘a512’. The second universe starts at ‘b1’ and runs through ‘b512’. This continues up through all 16,384 potential DMX-512 channels in Pc•MACs.

When DMX-512 networking started was first created, DMX-512 addresses were all ‘0’ to ‘511’. This is what is called ‘zero-based’ (0-511) DMX-512 addressing. Some people had trouble wrapping their brains around the concept of ‘zero’ as a real number, so through the years, DMX-512 addresses have migrated to what is called ‘one-based’ (1 to 512) DMX-512 addressing.

There is really no difference internally between ‘zero-based’ (0-511) or the ‘one-based’ (1 to 512) DMX-512 addressing. Inside Pc•MACs, all DMX-512 addresses are stored as ‘zero-based’ (0-511) numbers. ‘One-based’ (1 to 512) addressing is really just ‘zero-based’ (0-511) addresses, with ‘1’ added to the address number before it is displayed. Add ‘1’ to ‘zero-based’ (0-511) addresses, and they are displayed as ‘one-based’ (1 to 512). Subtract ‘1’ from ‘one-based’ (1 to 512) addresses, and they are displayed as ‘zero-based’ (0-511) addresses.

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<sup>8</sup> ArtNet, which sends DMX-512 data over a standard wired or wireless LAN combines all the universes into one big block of data. When the DMX-512 is broken out of the ArtNet and back into standard DMX-512 wiring, the data is once again divided into traditional 512 channel DMX-512 networks.

You can freely switch between displaying ‘zero-based’ (0-511) or ‘one-based’ (1 to 512) DMX-512 addressing in Pc•MACs at any time. This is selected from the [‘Preferences’ menu’s DMX-512 Addressing](#) options.

Virtually all third party lighting equipment now uses ‘one-based’ (1 to 512) DMX-512 addressing.

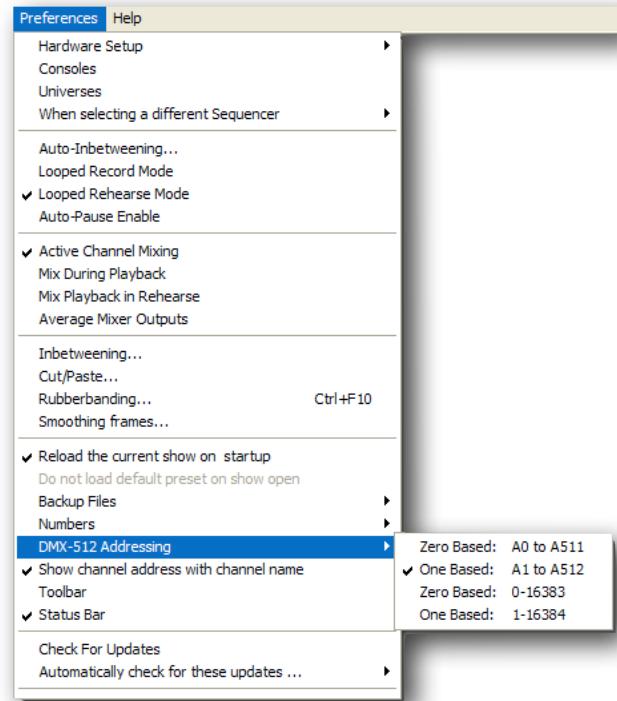
The majority of current GilderGear can be set to use either ‘zero-based’ (0-511) or the ‘one-based’ (1 to 512) DMX-512 addressing. Most older GilderGear will still use the original ‘zero-based’ (0-511) addressing. Sd-50/8s and Sd-50/40s are configured automatically for you by Pc•MACs, so you don’t need to manually address them. Any Sd-25 w/DMX that is used will generate a drag-n-drop folder for you, which includes a text document that tells you how to set the address on the player so that it will be addressed properly too.

When you are ready to start setting the DMX-512 addresses on any DMX-512 networked gear, you will want to make sure that the DMX-512 addressing in Pc•MACs is set to match the equipment you are addressing:

- Select ‘one-based’ (1 to 512) if your equipment uses this type of addressing (the vast majority of lighting equipment and current GilderGear).
- Select ‘zero-based’ (0 to 511) if your equipment uses this type of addressing (some older GilderGear and lighting equipment).

Once the ‘zero’/‘one’-based dmx addressing mode has been set to match your equipment, the addresses shown under the ‘Addr’ column in the [Channels List](#) are the DMX-512 addresses you need to use to set as the DMX-512 address of any external gear that is attached to the DMX-512 network. This external gear can include GilderGear, dimmers, RGB lights, fans, smog machines and a myriad of other devices.

Devices which use more than a single DMX-512 address will automatically use consecutive addresses. You only need to set the device to listen to the first of these addresses, and the device will automatically listen to the following channels as well. In the [Channels List](#) above,



Type	Addr	Bits	Name
dgtl	7	1	Audio +02
dgtl	7	2	Audio +04
dgtl	7	3	Audio +08
dgtl	7	4	Audio +16
dgtl	7	5	Audio +32
dgtl	7	6	Audio +64
dgtl	7	7	Audio Stop
> Center Center Jet			
V Center Center Lights			
anlg	242	8	Center Center 01 blue
anlg	241	8	Center Center 01 green
anlg	240	8	Center Center 01 red
> Center Inward Arch Jets			

there is a Red/Green/Blue (RGB) LED light named ‘Center Center Lights’<sup>9</sup>. You would set this fixture to DMX-512 address ‘240’ for the Red light, and it would automatically listen to DMX-512 addresses ‘241’ and ‘242’ for the Green and Blue lights, respectively.

Since this myriad of devices may come from a myriad of manufacturers, each may have a different method used to set the DMX-512 address.

Most DMX-512 gear uses dipswitches, rotary switches, or a simple button interface with a LED or LCD screen.

Some gear uses what is called ‘Remote Data Management’ (‘RDM’) to set the devices’ addresses through the DMX-512 network. This generally requires a dedicated handheld tool, or program running on your PC to set the DMX-512 addresses.

Most GilderGear is either addressed automatically by Pc•MACs, manually by using rotary or dipswitches, or by using an internal menu accessed through the unit’s serial port:

- 1) Open GilderTerm. This can be the stand-alone version or the one found under the [‘RealTime’ menu](#) in Pc•MACs.
- 2) Connect the GilderDevice to be configured to the serial port on your computer
- 3) Hit the ‘configure’ button on GilderTerm. This will open the device’s internal menu.
- 4) The command for setting the address is always the very first command on the device’s internal menu. It is always invoked by hitting the letter ‘A’.
- 5) The device’s menu will prompt you to enter the new DMX-512 address for the device. If it asks for an address that is 0-511, you know it is using zero based DMX-512 addressing. If it asks for an address that is 1-512, then you know it is using one-based DMX-512 addressing.
- 6) Enter the DMX-512 address and hit <return>
- 7) Exit configuration by pressing the same GilderTerm button that was used to enter configuration, which is now labeled ‘Config Done’.

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<sup>9</sup> The [Channels List](#) happens to be sorted ‘by name’ rather than ‘by DMX-512 address’, so the DMX-512 addresses appear in reverse order in this view.

## What to do if Your Device Isn't In the GearList?.....

Most devices will be added to the [Channels List](#) using the 'add Devices...' command. If you are attaching an output device which is not in the lists of available devices, you can make up your own transient 'Devices' by simply adding the analog and digital outputs that they need to operate. There are instructions for making your own permanent 'Devices' and adding them to the third party GearList later in this manual.

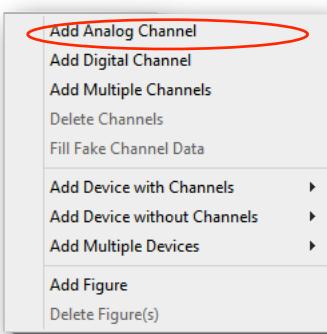
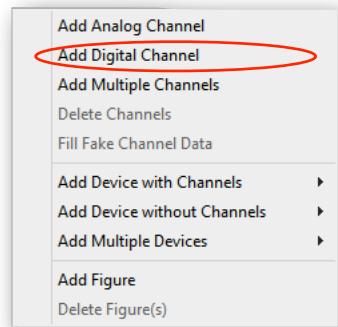
All outputs are either:

- Digital (on/off), occupying only 1/8 (one bit) of a DMX-512 channel.
- Analog (output that varies between 0 and 100%, like a light dimmer). Most analog devices (like a light dimmer) use only eight bits of resolution, although some do use higher than eight bits of resolution <sup>10</sup>.

There are several ways to add individual analog and digital outputs to Pc•MACs' [Channels List](#):

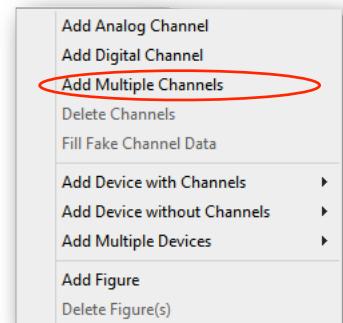
1) You can create digital output channels one at a time by using the ['Channels' menu's](#) 'Add Digital' or the right+<click> shortcut menu 'Add Digital' command. If you select (highlight) one of the 'Figure' folders you have already created, any output channels you create will be added to this folder.

2) You can create analog channels one at a time by using the ['Channels' menu's](#) 'Add Analog' or the right+<click> shortcut menu 'Add Analog' command. You can select from all the analog resolution that Pc•MACs supports. Use 8 bits of resolution, unless you are dead certain that the device you want to control needs a higher resolution. If you select (highlight) one of the 'Figure' folders you have already created, any output channels you create will be added to this folder.



<sup>10</sup> Pc•MACs supports analog resolutions of eight, twelve, sixteen, twenty-four and thirty-two bits. Pc•MACs supports all of these resolutions using either big-endian or little-endian formats for the data.

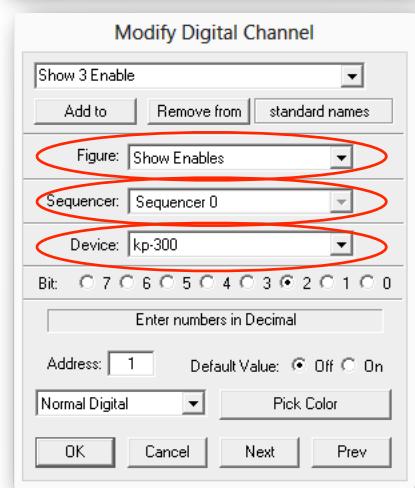
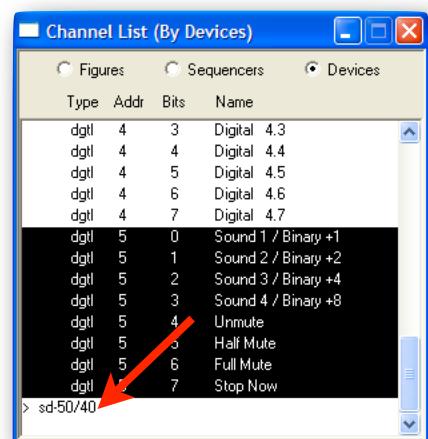
- 3) You can create multiple digital and analog channels using the '[Channels](#)' menu's 'Create Multiple...' or the right+<click> shortcut menu 'Create Multiple...' command. This command will ask you for the number of analog output channels (and their resolution) and digital channels you want to create. If you select (highlight) one of the 'Figure' folders you have already created, any output channels you create will be added to this folder.



## Move those channels.....

- A) Select one or more output channel or 'figure' folder, and drag and drop it to a new location in the [Channels List](#). You can use the <shift> to make contiguous selections, to the <Control> key to select discontinuous selections. This allows you to move any number of channels in one quick drag-n-drop.
- B) Double clicking on any output channel or selecting an output channel and then choose the '[Channels](#)' menu's 'Modify' command opens the channel information dialog. From there, you can select a different 'figure' folder, 'Device' folder or sequencer for this one channel. You can only move one channel at a time using this technique.

Pc•MACs doesn't care how you organize your [Channels List](#). It just needs to know that the channels exist and where they are addressed. How they are organized is strictly for your convenience.



## Name those channels.....

You can modify any ‘figure’ folder or output channel by:

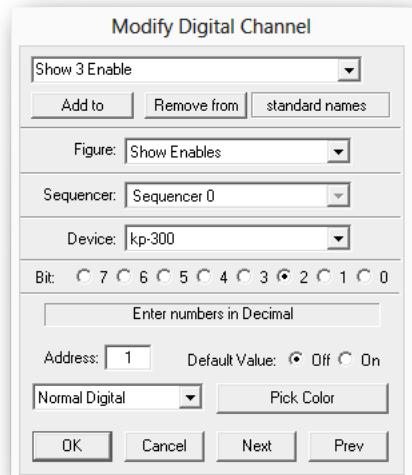
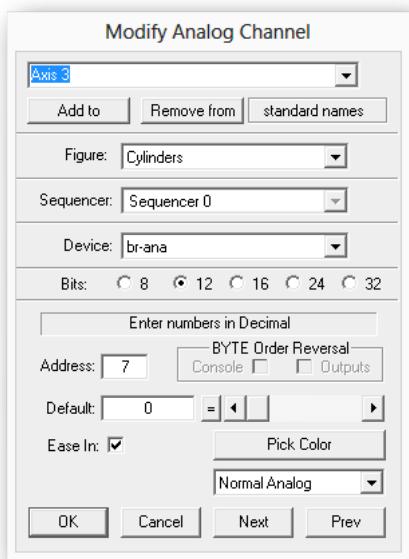
- 1) Double clicking on any output channel
- 2) Select the output channel and choose the [‘Channels’ menu’s ‘Modify’ command](#)

You can change the name, set the default levels for analogs (or ‘on’ or ‘off’ for digitals), and the sequencer, ‘Figure’ folder and figure assignment for a channel. You can change the address of an output, but Pc•MACs won’t let

you change an address to overlap with any other existing channel. Leave the DMX-512 address where Pc•MACs put it, leave the analog resolution at eight bits (analog functions only) and don’t modify bit number (digitals functions only) unless you know what you are doing.

Note that the names shown on the OffLine Editing Window, Soft Console and other dialogs won’t reflect any changes you have made until you close the output channels’ dialog.

You can use the ‘Next’/‘Last’ Buttons to view and edit the next or previous output channel(s) without closing the output channels’ dialog.



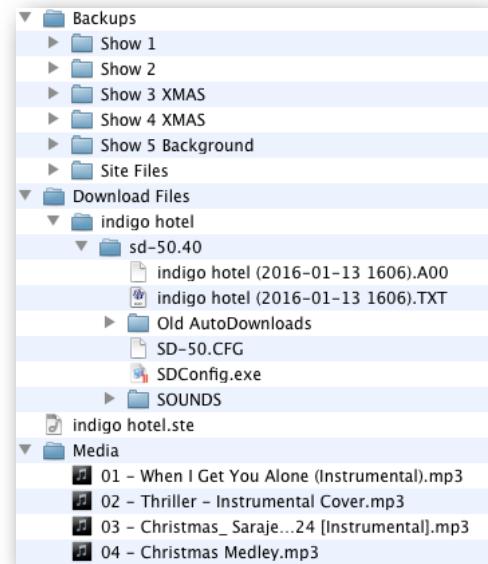
## Saving your show.....

At this point it is time to save the work you have done so far.

If you have created a new Site file for a new project, you’ll need to create a ‘new’ ‘project’ folder for holding all the files that Pc•MACs creates and uses for this one site. Create the folder, and name it anything you like. Pc•MACs will organize this folder as follows:

- 1) Your .STE (Site) file is stored at the root level of this folder.
- 2) All of your .SHO (Show) files are normally stored at the root level of this folder.
- 3) One ‘Media’ folder for any Audio/Video files that your shows have used in your shows. Pc•MACs copies the media files from this folder during AutoDownloads, so if you update your media without changing the filename, extension or length, do it in this folder.

- 4) If the optional '[Preferences](#)' menu's Backups are enabled, then a 'Backup' folder will be created after you have saved your shows more than once. It will contain:
  - A) A folder for each show will be created as you save them. The names of these folders will match the names you give your shows.
  - B) A 'Site Files' folder for your site (.STE) file backups
- 5) One 'Download Files' folder will be added when you do your first AutoDownload. This folder contains:
  - A) One folder for each .STE (Site) file you have AutoDownloaded to in this folder. There is typically only one of these. Inside this, Pc•MACs will place:
    - I) The individual drag-n-drop folders for each [AutoDownload 'Target'](#) and Audio/Video device you have used in your shows. Just drag-n-drop the contents of this entire drag-n-drop folder into a freshly formatted Sd flash card, and insert the Sd flash card into the 'Target' device. Inside each of these drag-n-drop folders, Pc•MACs will have placed:
      - a) If this is the [AutoDownload 'Target'](#), this is the default location where Pc•MACs will put the AutoDownload file for the shows you are AutoDownloading.
      - b) If this is the AutoDownload 'target', this is the default location where Pc•MACs will have put the 'set' file. This is a text document that lists what shows went into the AutoDownload.
      - c) 'Old AutoDownloads' folder, which Pc•MACs uses to back up earlier AutoDownloads. Although it won't do any harm (the old '.a00' AutoDownload files are renamed as '.old' by Pc•MACs), there is no reason to drag this folder or its contents to the Sd card for the [AutoDownload 'Target'](#). It can get really BIG after a few AutoDownloads.
      - d) For each Sd-50/8 or Sd-50/40 in your [Channels List](#), Pc•MACs will also put everything that an Sd-50/xx needs to run into this same



drag-n-drop folder. If the Sd-50/xx is also the ‘target’ for the AutoDownload, this folder will be combined with the AutoDownload file and .SET file as described above. The Sd-50/xx -specific content includes:

- i) Sd-50.CFG configuration file for the Sd-50/xx. Note: Pc•MACs has already configured the Sd-50/xx for you. Don’t open this file unless you know what you are doing!
- ii) The Sd-50 Config.exe program which allows you to open and manually modify the Sd-50.CFG configuration file. Note: Pc•MACs has already configured the Sd-50/xx for you. Don’t open this program unless you know what you are doing!
- iii) A ‘SOUNDS’ folder, containing all the SoundFiles used by this Sd-50/xx in the shows that are in the AutoDownload file.
- e) For each Sd-25 w/DMX in your [Channels List](#), Pc•MACs will put everything that an Sd-25 w/DMX needs to run into a drag-n-drop folder.
  - i) A text document listing all the SoundFiles used on this **Sd-25 w/DMX** and how you need to set the dipswitches on the **Sd-25 w/DMX**. Setting the dipswitches as shown on the text document will put the Sd-25 into the correct operating mode and address it as needed for your show.
  - ii) All the SoundFiles used by this **Sd-25 w/DMX** in the shows that are in the AutoDownload file.
- f) For each v-Hd-to-DMX in your [Channels List](#), Pc•MACs will put everything that an **v-Hd-to-DMX** needs to run into a drag-n-drop folder.
  - i) Each VideoFile used in your shows on this BrightSign player will be copied from the Media folder put into a numbered ‘playlist’ folder. This is how the GilderScript, running on the BrightSign player expects to see the Sd card arranged<sup>11</sup>.

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<sup>11</sup> The GilderScript is purchased separately and must be on the Sd card your are using, or the VideoFiles will not be played. If you need a ‘background’ loop video to play between triggered videos, you can throw all the videos for the background loop into a folder called ‘Background Loop’ and put this onto the Sd flash card as well. You can choose whether the background videos will be played sequentially or in random order.

Because this is a new show, the show remains ‘Untitled’ until you have saved it with a different name. You can find the ‘Save’ command in the usual place under the [‘File’ menu’s Save](#). The first time you save a show, it will ask you for a ShowName. If you want to save any show under a different name, you can always use the [‘File’ menu’s ‘Save as...’](#) command and give the show a new name, or save it in a new location. Try to avoid doing the latter.

You should save the show often enough that you won’t get really pissed off if the computer was to crash.

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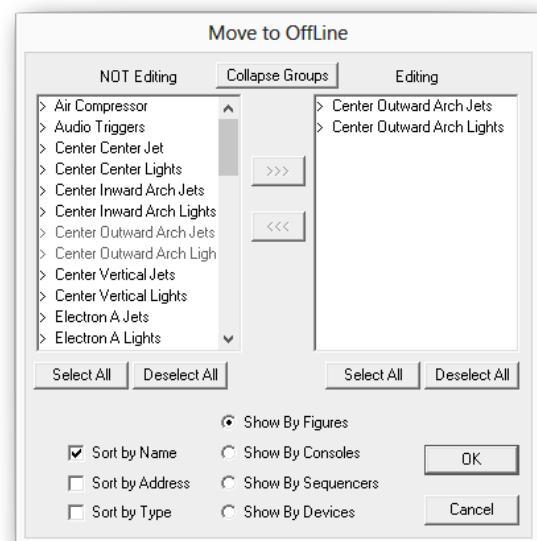
## Editing your show.....

If you have already moved the channels you want to edit over to the OffLine Editing Window, you can skip the next step and open the OffLine window directly. Do this by pressing the 'OffLine' button on the Main Control Window, or using the 'OffLine' menu's 'Show OffLine...' command. Pc•MACs will remember the last channels that were being edited for a given site file.

### Moving Channels to the OffLine Editing Window for Editing.....

Now that we have some channels created, we can start editing them. Open the '[OffLine](#)' menu's '[Move to OffLine...](#)' dialog. This dialog has two columns on it. In the left column are all the figures and channels you have created. In the right column are the channels you will be editing<sup>12</sup>.

You can also access the '[Move to OffLine...](#)' dialog if you have already opened the OffLine Editing Window by pressing the big 'Selected Channels' button at the bottom of the OffLine Editing Window.



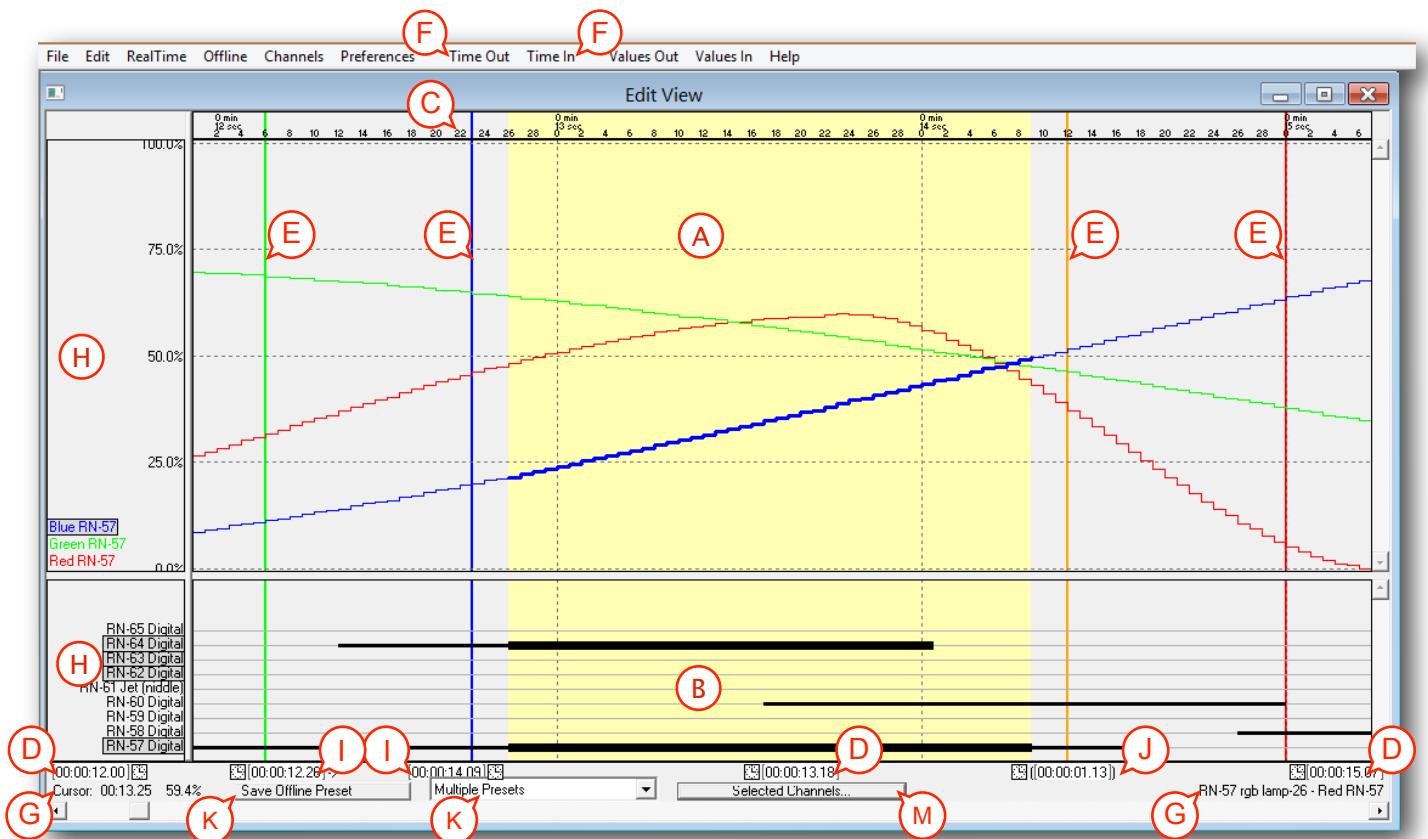
On the '[Move to OffLine...](#)' dialog, your outputs can be shown and/or sorted by:

- The figures the movements have been assigned to.
- The Console Presets the movements have been assigned to.
- Alphabetically by the movement names.
- Numerically by the DMX-512 addresses assigned for the outputs.
- By Types. This segregates the analogs and digital functions, and sorts them separately using the criteria set above.

You can select whole figures, or just some of the channels for editing by highlighting them and either dragging them or pressing the 'Move' button between the two columns. Move a few analogs and a few digitals from the left column to the right column of the '[Move to OffLine...](#)' dialog. Press the 'OK' button when you are done. This will open the OffLine Editing Window (if it wasn't already opened).

<sup>12</sup> If you have assigned any analog or digital movements to a figure, you can 'open' up the figure by clicking on the '>'.

## Quick Tour the OffLine Editing Window.....



A complete description of the OffLine Editing Window and its features can be found in the '[OffLine' Editing Window](#) chapter.

- On the OffLine Editing Window, you will see the analog (0-100%) functions displayed in the upper pane. If nothing has been programmed on the analog channels yet, your analogs should appear as a horizontal colored line(s) along whatever has been set as the default value(s) for them (usually either 0% or 50% on the analog pane). Each analog channel is assigned a color when it is created. You can change the color of the line by double clicking on the name of the channel in the [Channels List](#), and then pressing the 'color' button. The selected range of time is shown as the area with the yellow background. If an analog is selected in the area of time which is selected, the line will be drawn more thickly, and will be effected by any analog editing command that is invoked (only the Blue Channel is selected in this example). Channels that are not selected, or are outside of the selected range of time will not be altered.
- The digital (on/off) functions are shown in the lower pane. With nothing programmed into them, the digitals will appear as light blue lines running horizontally in the digital window pane. If the channel is 'ON', the line will be drawn

in black. The amount of time that the line is drawn in is the amount of time that the output will be 'ON' during your show. The selected range of time is shown as the area with the yellow background. If a digital channel is 'ON' in the area of time which is selected, the black line will be drawn as even thicker, and will be effected by any digital editing command that is invoked. Channels that are not selected, or are outside of the selected range of time will not be altered.

### **Where in the show are we?.....**

- C) Time is displayed along the top of the window. In this zoom level, the major markers are shown at each second through the show.
- D) The times shown at the lower left, center and lower right of the screen are the show times at those points on the window. You can use the slider at the bottom of the screen to move to a different point in the show, or modify any of these times to move to a different point in the show.

If you have placed Drag-n-Drop Triggers on the OffLine Editing Window, hitting <Control>+<left arrow> or <Control>+<right arrow> instantly snaps the OffLine Editing Window to the last or next marker.

### **Transport Time Markers.....**

- E) The 'Transport' markers effect what happens when you invoke any to the RealTime programming and playback commands (Play, Record, Rehearsal). The green, blue, orange and red vertical lines mark the Playback 'Start', Record/Rehearsal 'Punch In', Record/Rehearsal 'Punch Out', and Playback 'End' times.

Double clicking anywhere on the analog or digital pane of the OffLine Editing Window (except on a channel or other object) sets the playback start time.

### **Change the amount of show you see.....**

- F) You can zoom in to see just a few frames of your show, or zoom all the way out to see the entire show at once. You can do this using the '[OffLine menu's](#) Time Scale commands, or 'Zoom In' or 'Zoom Out' buttons at the top of the OffLine Editing Window.

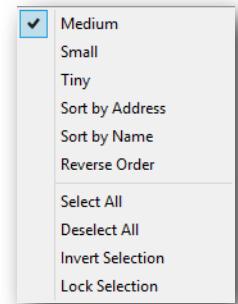
You probably don't want to zoom in or out too far. If you zoom too far out, you may not be able to see short events. By default, Pc-MACs will display two to four seconds of a show (depending on your computer's screen resolution).

### **Which channel is which?.....**

- G) As you move the cursor over any analog or digital function, you will see its name displayed in the lower right corner of the window. The time at the cursor is displayed at the lower left corner of the OffLine Editing Window. If you are moving the cursor

in the analog pane of the OffLine Editing Window, the analog value of the cursor is also displayed.

H) The names of the analogs and digitals are also listed at the left side of each pane. You can rearrange the order of the digital channels by simply dragging their names up or down within the list, or RightClick near the names and pick the way you would like to sort the channels.



### How Much Time Is Selected?.....

- I) If a stretch of time has been selected on the OffLine Editing Window it will have a yellow background. These two times show the start and end of the selected area.
- J) This displays the 'delta', or length of the selected area.

To change the selected area, you can modify these times, or **<shift>+<LeftClick>** on the analog or digital pane (avoid clicking on or near any analog or digital channels) to change the amount of time selected.

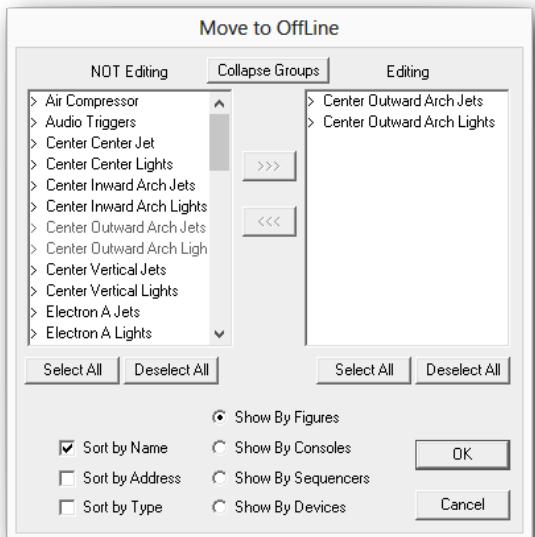
### OffLine Editing Window Presets.....

K) Once you have moved channels over to the OffLine Editing Window and sorted them into an order that you will be using more than once, you will want to save a OffLine Editing Window preset for your setup. The (J) button and dropdown are used to save and recall OffLine Editing Window presets. These command are also available under the '['OffLine' menu](#).



### Selected Channels.....

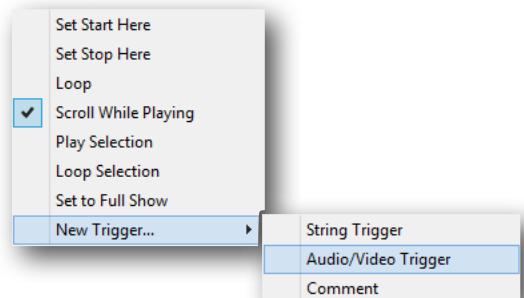
- L) This gets you back to the '[Move to OffLine...](#)' two column mover dialog, where you can move output channels on and off of the OffLine Editing Window if you aren't using presets.



## OffLine Editing Window shortcut menu.....

RightClicking with your mouse on the OffLine Editing Window (avoid RightClicking on or near any analog or digital channels) will open a shortcut menu. This menu has even more shortcuts for you to use on the OffLine Editing Window:

- a) Set Start Here: Copies the point in time where you RightClicked to the ‘Start Time’ on the Main Control Window.
- b) Set Stop Here: Copies the point in time where you RightClicked to the ‘Stop Time’ on the Main Control Window.
- c) Loop: This toggles the ‘Loop’ flag. The ‘Loop’ toggle can also be found under the [‘RealTime’ menu](#) and on the Main Control Window. When the show is started (Playing/Recording/Rehearsing) the show will start at the ‘Start Time’, and continue to the ‘Stop Time’. If the ‘Loop’ checkbox is OFF, then the show will stop. If the ‘Loop’ checkbox is ON. Pc•MACs will start the show over at the ‘Start Time’, performing an Easeln at the loop if this option is enabled.
- d) Scroll While Playing: This enables/disables the automatic scrolling of the OffLine Editing Window as a show is played. With it on, the OffLine Window will scroll to keep the frame being played at the center of the window.



This command is also available under the [‘OffLine’ menu](#). There is also an option under the [‘OffLine’ menu](#) to use smooth scrolling or not. If it is off, then the OffLine Window will scroll, but by snapping forward a screen width at a time. This can help if your computer is too underpowered to scroll smoothly.

- a) Play Selection: Clears the ‘Loop’ toggle, and copies the ‘Start of Selected time’ to the ‘Start Time’ on the Main Control window and the ‘End of Selected time’ to the ‘Stop Time’.
- b) Loop Selection: Sets the ‘Loop’ toggle, and copies the ‘Start of Selected time’ to the ‘Start Time’ on the Main Control window and the ‘End of Selected time’ to the ‘Stop Time’.
- c) Set to full Show: This instantly sets the ‘Start Time’ on the Main Control window to the beginning of the show (00:00:00.00) and the ‘Stop Time’ to the end of the show.
- d) New Trigger: See next section....

## Adding Drag-n-Drop Triggers to Your Timeline.....

You can add drag-n-Drop marker to your show by simply RightClicking with your mouse on the OffLine Editing Window (avoid RightClicking near any analog or digital channels). This will open a shortcut menu. If you mouse down to the ‘Add Trigger...’, you can slide to the right to select whether you want to add:

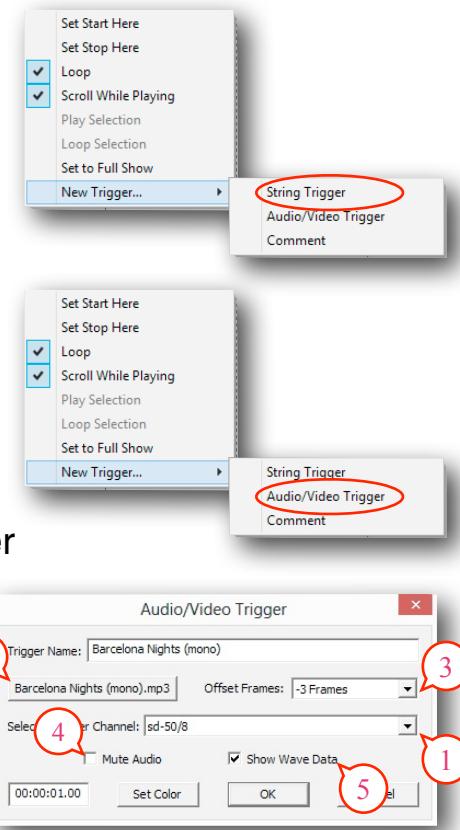
- a) A ‘String’ Marker: This allows you to send serial strings to control other devices from your show’s timeline.
- b) An Audio/Video Trigger: This is the preferred method of triggering audio and video files to a show, rather than using the audio/video ‘sync’ on the [‘File’ menu’s ‘Show Information....’ dialog](#).

If there are multiple, overlapping audio triggers in your show, the audio can be mixed together, or individual tracks can be muted as needed.

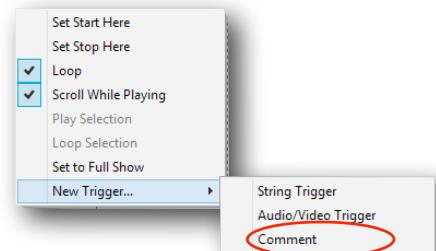
If there is more than one Audio/Video player in your [Channels List](#), dropdown ① is used to select which player this trigger is for. Press ② to pick your Audio/Video file. When selecting your SoundFiles or VideoFiles, Pc•MACs will filter so that you will only see the appropriate type of files on the file open dialog. You can pop open the ‘file type’, and select between SoundFiles, VideoFiles or ‘all files’ to display.

While you are programming your show, you will typically be listening to the sound from your computer. If you begin playback before this trigger (after you have done an AutoDownload and moved the Audio/Video files to the player), you will also hear it from the Audio/Video player. If they are not perfectly in sync, use the ③ drop-down to adjust the playback until it sounds like just one source is playing. This indicates that the sync is perfect.

If ④ is checked, then the Audio/Video will be temporarily disabled on your computer. Only one Audio/Video track can have its waveform displayed. Checkbox ⑤ is used to turn off/on the display of this track’s waveform.



c) A ‘comment’ marker: This allows you to add notes in your show’s timeline. These can be dialog from your show’s script, or simply notes to yourself. You paste or type in whatever text you want to see. You can set the point in time and the color of the marker. The name of the marker will be the first bit of text in the comment.

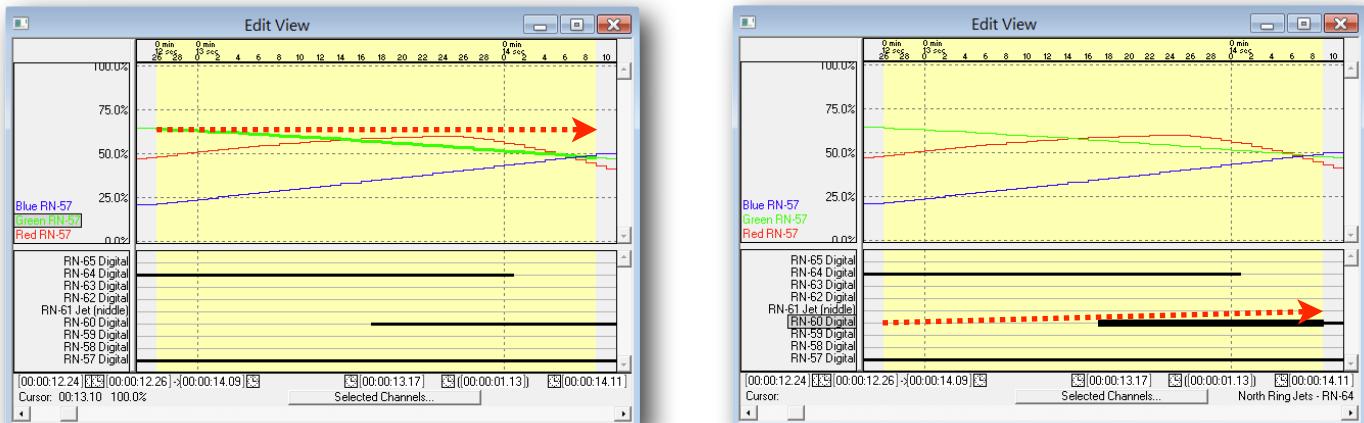


**Hint:** If you have dialog with multiple speakers, color coding individual voices can make it much easier to quickly find a particular speaker’s lines.

You can reopen any drag-n-drop marker by double clicking on it, or LeftClicking on the marker, dropping down the shortcut menu and selecting ‘edit...’. The shortcut menu also allows you to show or minimize the marker’s name. If the marker is an Audio/Video trigger, you can also select whether the Audio/Video waveform is shown on the OffLine Editing Window (only one waveform can be visible at one time), and whether the audio is muted/video is displayed (only one active video window is allowed at one time).

### Selecting one or more channels for modification.....

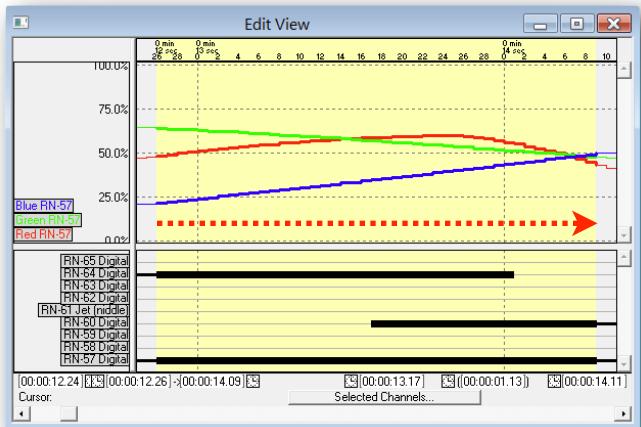
You can select a single channel for a stretch of time by LeftClicking on that channel and sliding the mouse to the left or right before releasing the mouse button. On the left, a single analog channel is selected (the green one). On the right, a single



digital channel ('RN-50 Digital') is selected. The mouse movement is shown by the dotted arrow. It starts on the desired channel, and moves left or right.

You can select all the channels that are being displayed by LeftClicking anywhere on the screen except on a channel and sliding left or right before releasing the mouse button, as shown at right.

You can see what channel(s) are selected by the width of the lines they are drawn with. When a channel is selected, the lines get fatter.



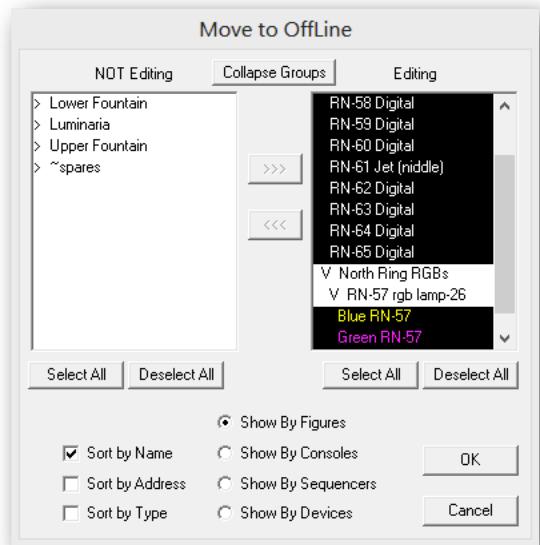
### Changing the channels you selected.....

Individual channels can be selected or deselected by **<shift>+LeftClicking** anywhere ON the channel (or its name) you want to select or deselect. The channel will fatten or thin up to show that it has been selected or deselected.

### Another way to change the channels you selected.....

You can double check which channels are selected by clicking on the 'Selected Channels' button at the bottom middle of the OffLine Editing Window. This will bring up the '[Move to OffLine...](#)' dialog again. Any channels that are selected will be highlighted in the right column. You can change which channels are selected by highlighting and unhighlighting channels in the right column of this dialog before you close it and go back to the OffLine Editing Window.

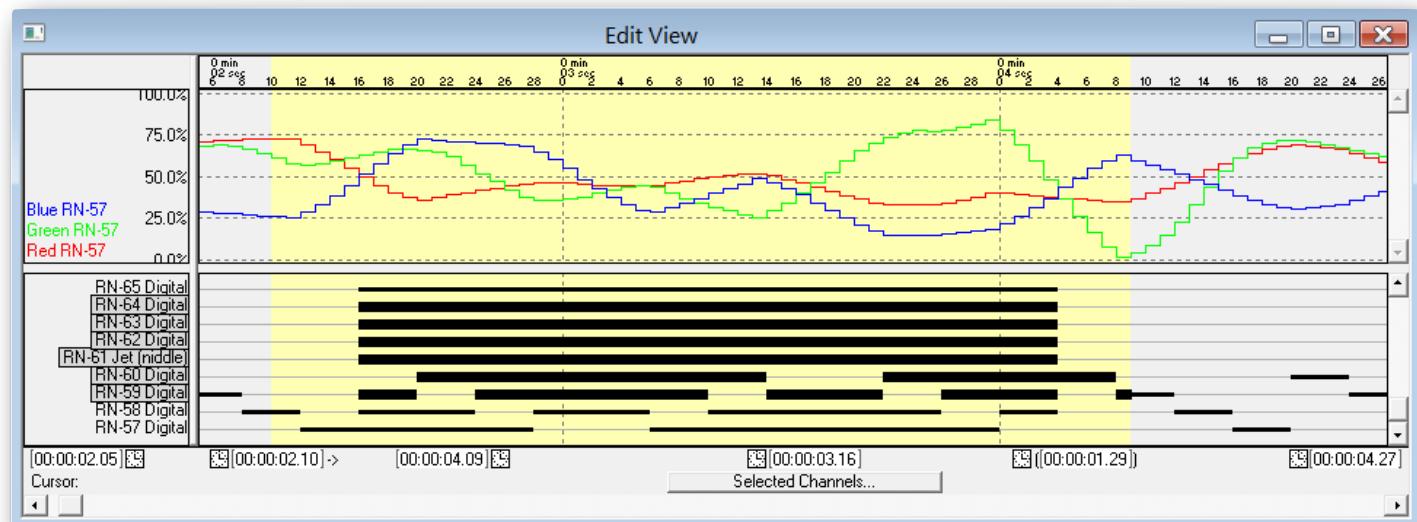
You can also use this dialog to move channels on or off the OffLine Editing window. In general, you want to keep the OffLine Editing window as empty as possible. Display only the channels you are going to be modifying. Too many channels on the OffLine Editing Window will look like a blur of lines. If you have too many channels on the OffLine Editing Window at the same time, you may actually bog down your PC as it tries to scroll them all.



### Yet another way to change the channels you selected.....

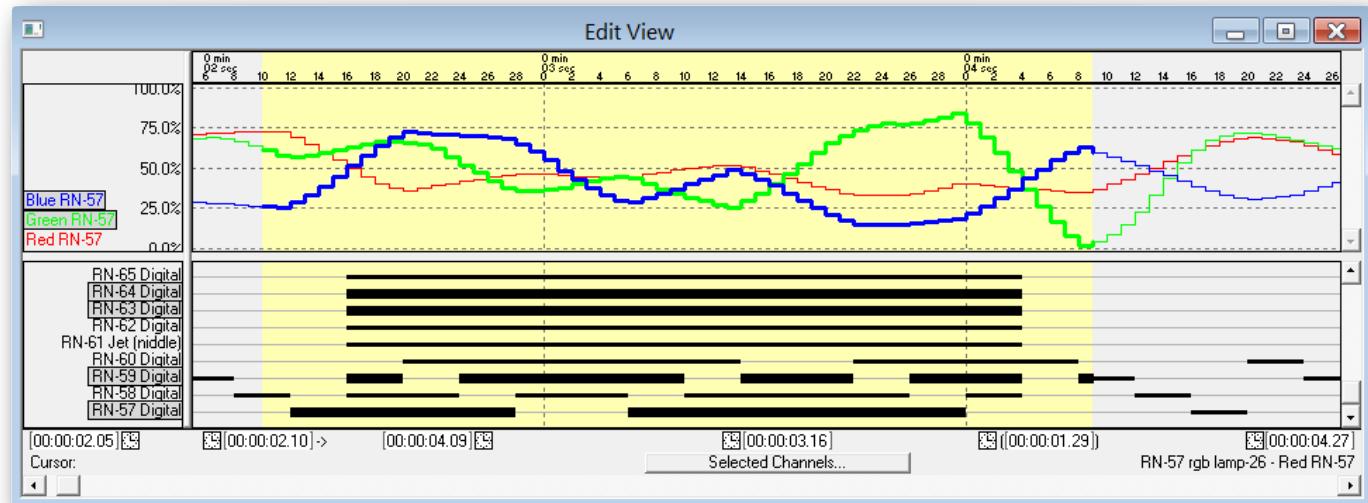
The names of the channels that are on the OffLine Editing Window are shown in the left margin. If you have anything selected on the analog or digital panes of the OffLine Editing Window, you can select/deselect the names in the left margin to select/deselect the channels. You can use the standard Windows LeftClick,

<Shift>+LeftClick and <Control>+LeftClick modifiers to select a single output, a contiguous range of channels or random selection of channels.



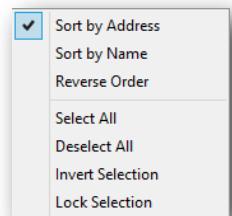
In the example above, the digital named 'RN-64 Digital' was initially LeftClicked to select it alone. <Shift>+LeftClicking on the digital named 'RN-59 Digital' selects it, and all the digits in between:

In this example, <Control>+LeftClicking is used to randomly pick any analog and/or digital outputs for editing:



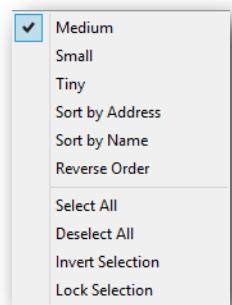
## Still more ways to change the channels you selected.....

If you RightClick in the left margin where the channel names appear, a shortcut menu will show you several options of inverting the current selection, selecting all the channels, deselecting all the channels or locking the current selection. When you lock the selection, when you 'copy' or 'paste' (or use any other command), only the channels that were selected are effected.



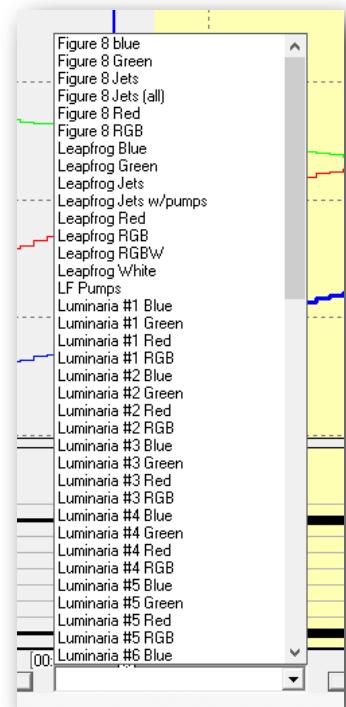
## Sorting the channels on the OffLine Editing Window.....

When programming a fountain or light show, it is common that one light or jet may be used as a part of several different patterns. In one pattern, it might be part of a circle. In another, it may be part of a straight line. If you RightClick in the left margin where the channel names appear, a shortcut menu will show you several options for sorting the channels alphabetically, by DMX-512 address, or reversing the current sort order. In addition, you can simply grab a channel name in the left margin by LeftClicking on it, and drag it up or down into whatever order you need.



## Saving and recalling the OffLine Editing Window Presets.....

If you have a particular selection of channels or the way you have sorted them on the OffLine Editing Window that you think you may need again in the future, you can save it as a OffLine Editing Window Preset. You can instantly recall a preset, and the output channels and their sort order will instantly be restored to the saved state.



If you hold the **<shift>** key down when selecting a console preset, the channels already on the OffLine Editing Window will not be moved off the window when a new preset is loaded. This allows you to display the channels from multiple presets at the same time.

OffLine Editing Window presets are the fastest way to move channels on and off the window, so you'll want to use these instead of the '[Move to OffLine...](#)' dialog that is used to initially move channels to the window.

## Changing the amount of time selected.....

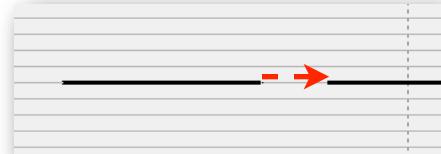
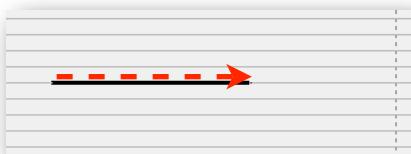
Once you have one or more channels selected, you can change the amount of time selected by modifying the times displayed at the bottom of the window. The

entries that are used for ‘from’ and ‘to’ times, and the ‘amount of time selected’ are the main ones you are the ones you will most often be changing. You can type in new numbers, RightClick (increment) or LeftClick (decrement) on a digit, LeftClick on a digit and slide the mouse up and down or once a digit is selected, use the up down buttons on the keyboard to modify these times. These numbers can be copied to other locations in the program, or copied from other locations using the ‘clock face’ shortcuts next to each entry.

A second way to change the amount of time selected is to `<shift>+LeftClick` anywhere in the analog or digital panes of the OffLine Editing Window (anywhere but on a channel). The selected area will extend to the new click point.

### Drawing digitals with a right mouse click.....

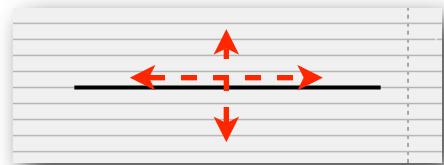
You can draw (shown at left) or undraw (shown at right) any digital function by RightClicking on it and sliding the mouse left or right. If you start on a point where the digital function is 'Off' (only a thin line is showing), it will be drawn in. If you click on a spot where the digital is 'On' (where the line is already fat), it will be turned 'Off' as



you RightClick and drag the mouse left or right.

### Moving digitals with a `<shift>+right mouse click`.....

If you press down the `<shift>` on your keyboard and RightClick on a digital, you can then ‘shift’ it left or right in time, or up and down to another channel without changing its length.



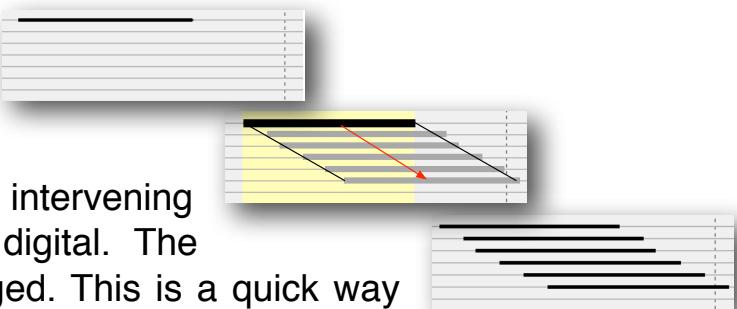
### Duplicating digitals with a `<Control>+right mouse click`.....

If you press the `<Control>` key on your keyboard and RightClick on a digital, you can then drag it to another output channel and it will be copied there. The original digital channel remains unchanged.



## Making a Chase with a <shift>+<Control>+right mouse click.....

If you press both the <Control> key and <Shift> key on your keyboard and RightClick on a digital, you can then drag a digital it to another output channel and Pc•MACs will fill in all the intervening channels with a copy of the original digital. The original digital channel remains unchanged. This is a quick way to make a ‘chase’ pattern across any number of digital output channels.



## Modifying analogs with a right mouse click.....

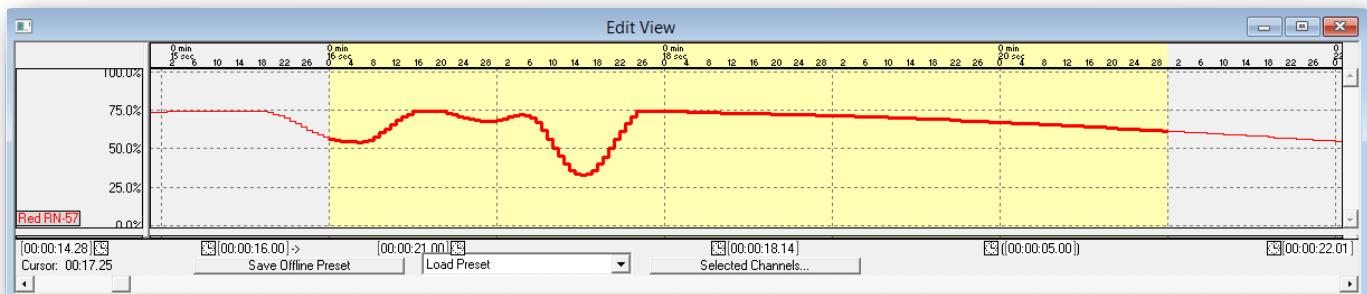
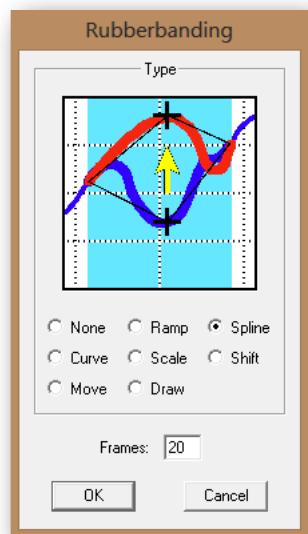
The tools that are used to ‘mush’ analog channels around are called the ‘Rubberbanding’ tools. This is because Pc•MACs allows you to stretch and modify the analog waveforms just as easily as you can with a rubber band. The settings for the Rubberbanding tools can be found under the [‘Preferences’ menu’s](#) Rubberbanding dialog.

Move the mouse over an analog function. RightClick on it and slide the mouse up or down. When you release the button, the wave shape will be modified. If a range of time has been selected, then that area will be Rubberbanded (instead of the default selection you made for twenty frames).

Spline is the most commonly used tool. It matches the edited analog to the data before and after the edit area.

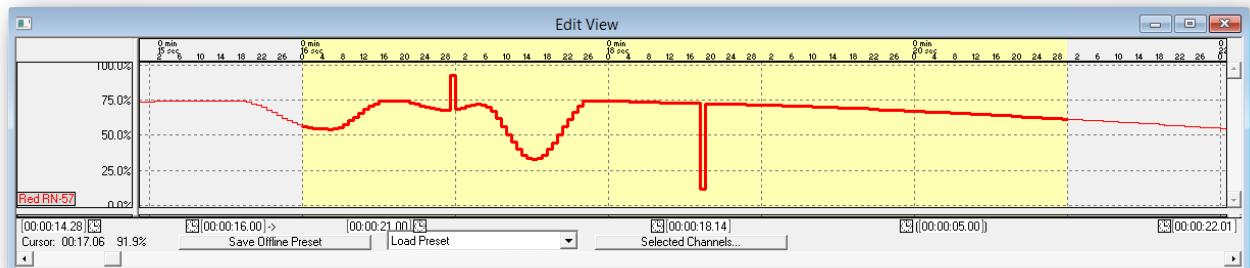
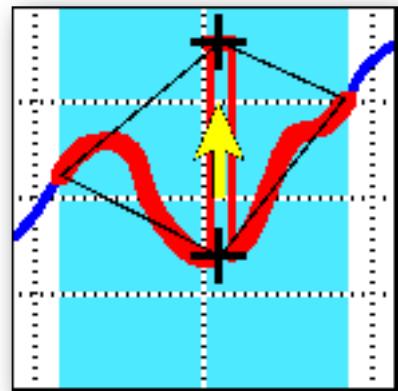
You can go to the [‘Preferences’ menu’s](#) Rubberbanding.... dialog and try out some of the other tools. The drawing that accompanies each tool shows graphically what it does. Only the ‘Pencil’ tool requires that a range of time be selected on the OffLine Editing Window for it to work.

All the foollowing Rubberbanding samples start with this waveform:

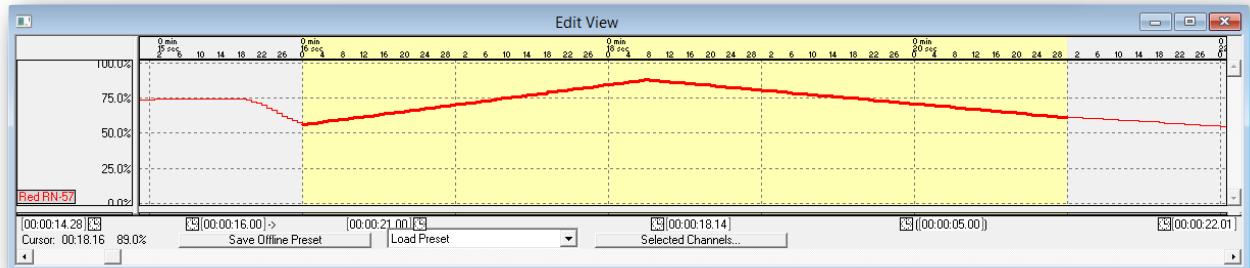
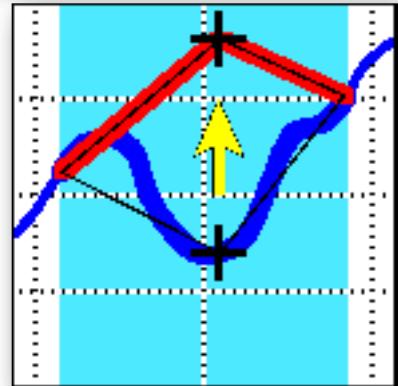


The different curves available to you for rubberbanding are:

- a) **None:** This is used when you just want to move the one point you select to a new value. This is the only Rubberbanding tool that doesn't care if you select a range of time or not. In either case, the one frame you clicked on can be pulled up or down as needed. No other data will be changed. This is a good way to add sharp bumps in the motion profile. This can also be used for triggering strobe lights or other lighting effects where you don't want the channel to ramp.

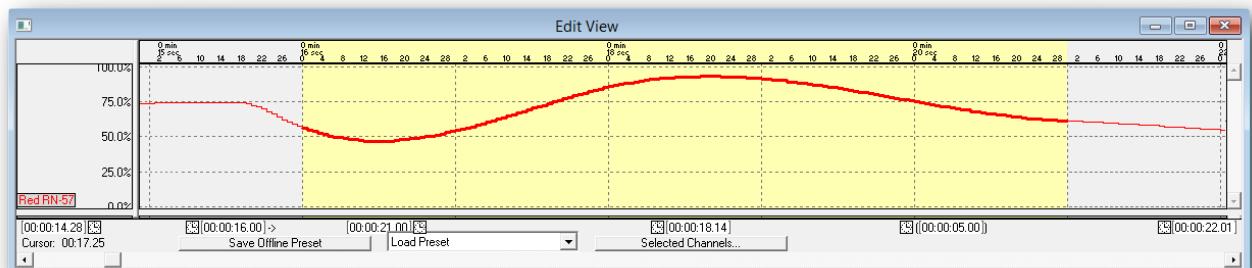
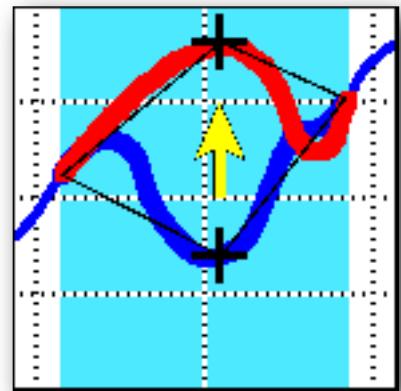


- b) **Ramp:** This generates a dead straight line between each of the points. It is the most basic type of ramping available. The left and right ends are anchored at the edges of the selected area (or the default number of frames, if a stretch of time hasn't been selected). The center point is wherever you released the right mouse button. The 'linear' curve draws only straight lines between points. This tends to make whatever the system is controlling look somewhat 'robotic'. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn't give the movements the subtlety that it takes to make a show look like it is

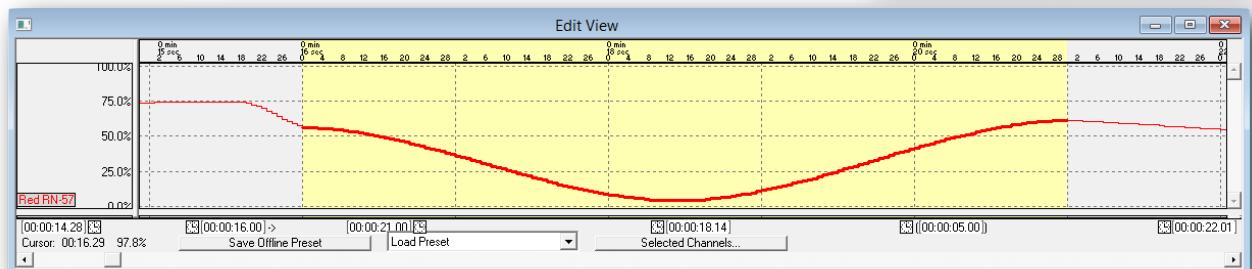
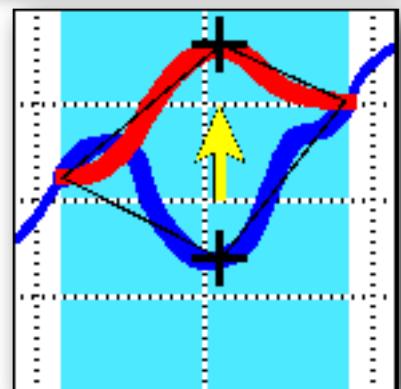


truly ‘alive’.

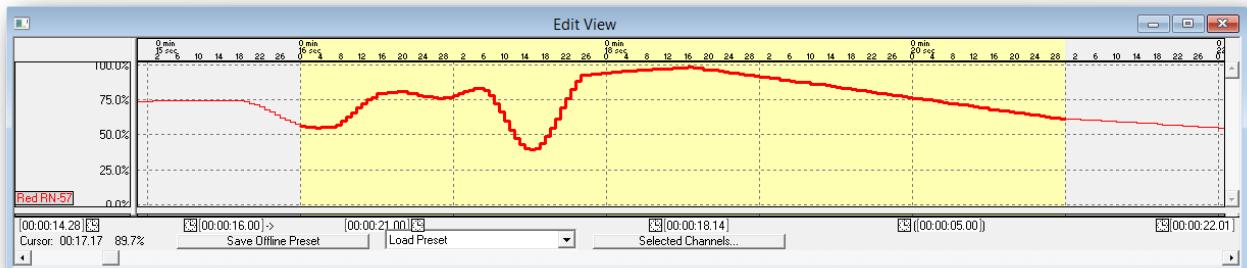
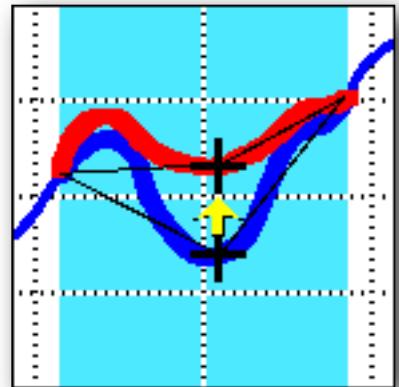
- c) **Spline:** This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the area of the edit. Because the ‘Spline’ is looking to match the data outside of the edit area, if this move has too high of a velocity (the angle of the line is acute), the spline may overshoot and hit zero or 100%. To avoid this, you may need to make some adjustments to the curve or to do your ‘spline’ over a few shorter distances, rather than one long stretch of time.



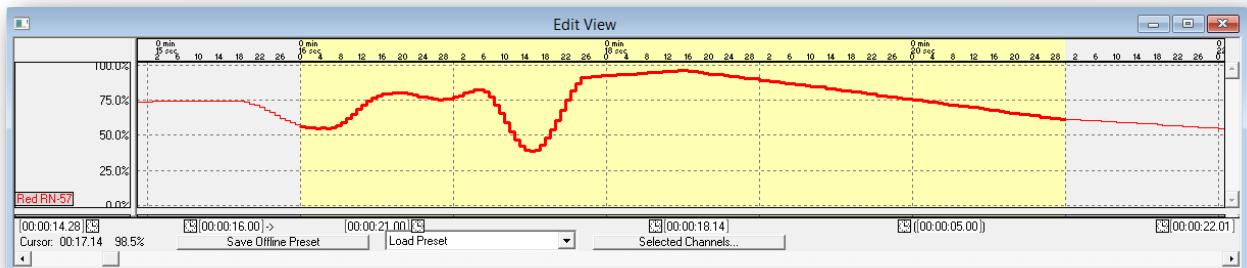
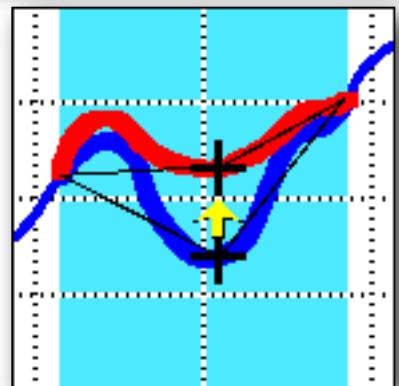
- d) **Curve:** Like the Spline above, except that it doesn’t match the data before and after the effected area. The start and end of the edit is always at zero velocity (the lines are level). This results in a simple ‘S’ curve.



- e) **Scale:** This setting expands a movement as you move the cursor further away from default position for the channel. The amplitude of the movements is increased as they move away from the default position while those near the default position remains unchanged. This allows movements to be made more ‘exaggerated’ without changing the movements near the default position. The effect of this command it virtually zero at the ends of the edit, and increase to the peak where you release the right mouse button to complete the edit. Another version of this editing tool is available under the [‘Edit’ menu’s Scale command.](#)

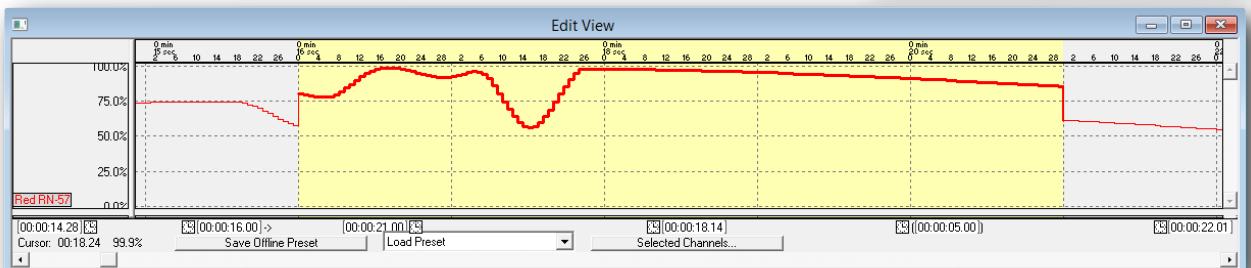
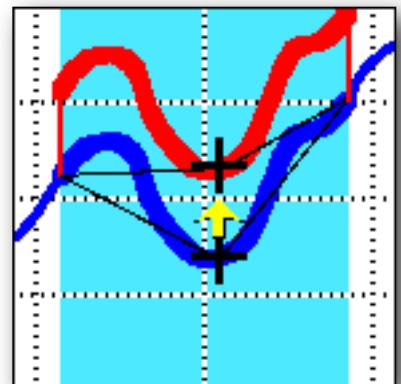


- f) **Shift:** This setting moves the analog movement in the direction you move the mouse without effecting the amplitude of the movements. This is as if the movements were drawn along the road surface of a drawbridge. As you move the mouse up or down, the center of the bridge raises and lowers at the mouse point without effecting the amplitude of the data. The data at the hinge points at both ends of the edit area are barely changed. Another version of this editing tool is

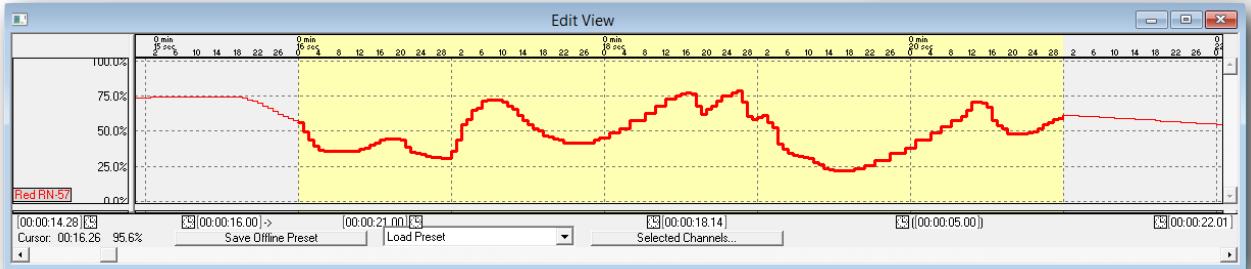
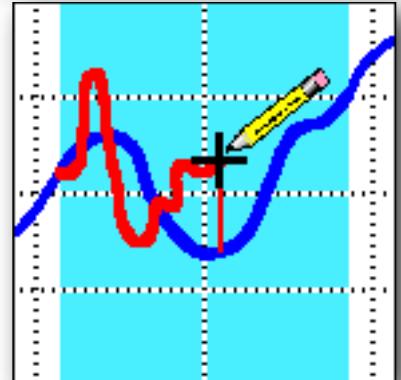


available under the [‘Edit’ menu’s Shift command.](#)

g) **Move:** This setting allows you to move the entire selected area up or down with the mouse. This puts your data onto the type of drawbridge where the moving deck raises and lowers horizontally. No attempt is made to match the endpoints of the edit with the data outside of the edit area. As long as the data doesn't hit zero or 100%, the waveform will not be altered.

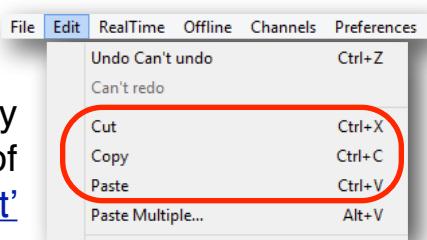


h) **Draw:** This is literally a 'pencil' tool. This setting allows you to 'draw' an analog waveform using the mouse. It is especially useful for 'drawing' in flickering light patterns, cleaning up mouth movements in animatronic figures or for particularly oddly shaped fade ins/out. The area of the edit must be selected before you start to draw using the 'pencil' tool.



## Cut, Copy and Paste, just like a word processor.....

Once one or more channels have been selected, you can use the standard cut/copy/paste functions that are used in every word processor known to mankind. The only difference is that here you are editing movements instead of sentences. These commands are all found under the 'Edit'



## menu.

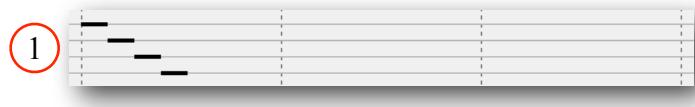
Just like your word processor, if you cut out a paragraph, all the text after it will slide forward in your document to fill the void. The same thing happens when you cut out a stretch of one or more movements. Conversely, if you paste a sentence into a document, all the text after it will have to slide backwards to make room for it. The same thing happens when you edit movement(s) in Pc•MACs too. If you select a paragraph in word processor and paste in a different paragraph that is exactly the same length, all the text after will not need to move. Again, Pc•MACs works in exactly the same way.

Note that if analogs are pasted, each end of the pasted data is automatically ‘cleaned up’ by the [‘Preferences’ menu’s ‘Cut/Paste Options’](#).

If the number of channels that you ‘copied’ does not agree with the number of channels you have selected when you ‘paste’, Pc•MACs will warn you of this imbalance. You can go ahead with the ‘paste’, or cancel out and try again.

## Paste in something a bunch of times.....

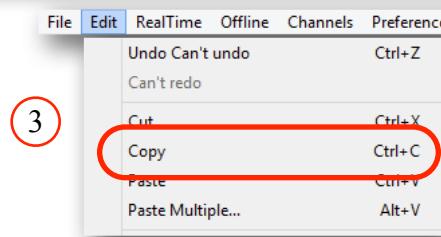
Something fun to try: ① Use the right mouse button to draw in a chase pattern on these digitals. You should end up with a pattern that looks something like a staircase.



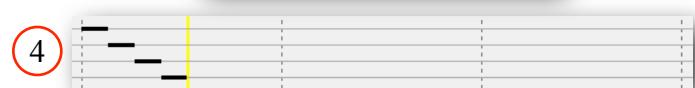
② LeftClick in the white background of the window and slide to the left or right to select your staircase.



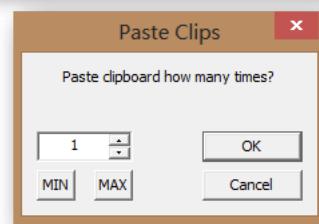
③ Select the ‘Copy’ command under the [‘Edit’ menu’s \(<Control>+C\)](#).



④ Select any single point on the OffLine Editing Window by clicking on it with the left mouse button. In this sample, the selection is immediately after the first ‘staircase’, as shown by the vertical yellow line.



⑤ Select the [‘Edit’ menu’s ‘Paste Multiple...’](#) command (<Option>+V). Enter in the number of times you would like to see this chase pattern repeat and click ‘OK’.



⑥ The ‘copied’ pattern will repeat for the number of times you selected, or until



it reaches the end of your show.

If you have a range to time selected before performing a Paste Multiple, then even if you have set it to 'MAX' repeats (9,999), it will only fill the selected amount of time.

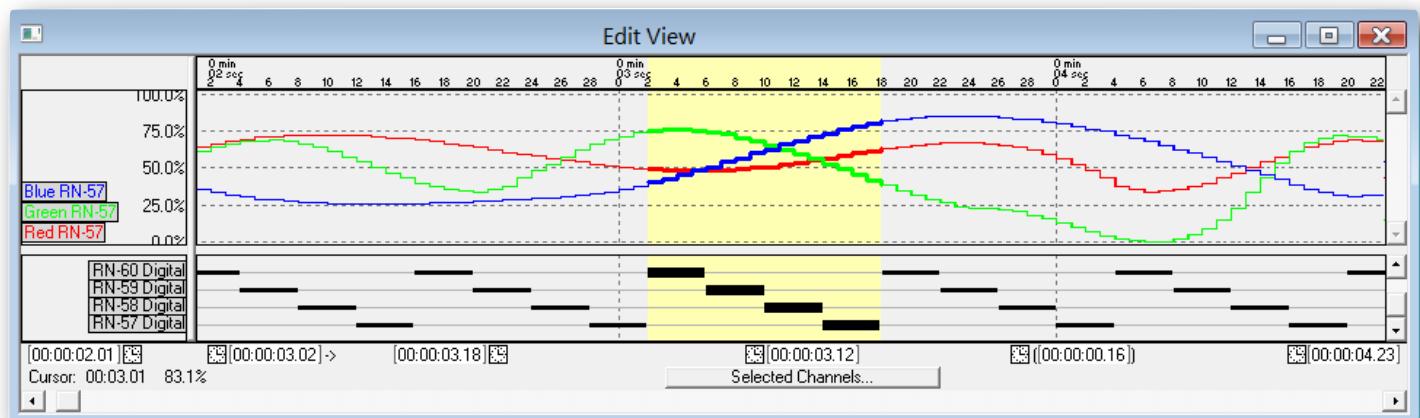
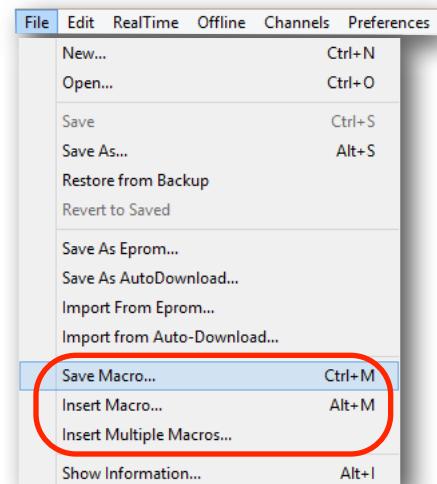
Note that if analogs are pasted, each iteration is automatically 'cleaned up' at each end by the '[Preferences](#)' menu's '[Cut/Paste Options](#)'.

### **Copy to a file.... Paste from a file.....**

All the cut, copy and paste commands you tried out in the last sections can be used to save one or more movements to files in addition to the Windows 'clipboard'. Instead of using the standard editing commands, select the '[File](#)' menu's 'Save Macro...', 'Insert Macro...' and 'Insert Multiple Macros...' commands. These allow you to 'paste' in a movement that you 'copied' years ago. The only limitation to the number of Macro files you can save is the capacity of your computer's hard disk.

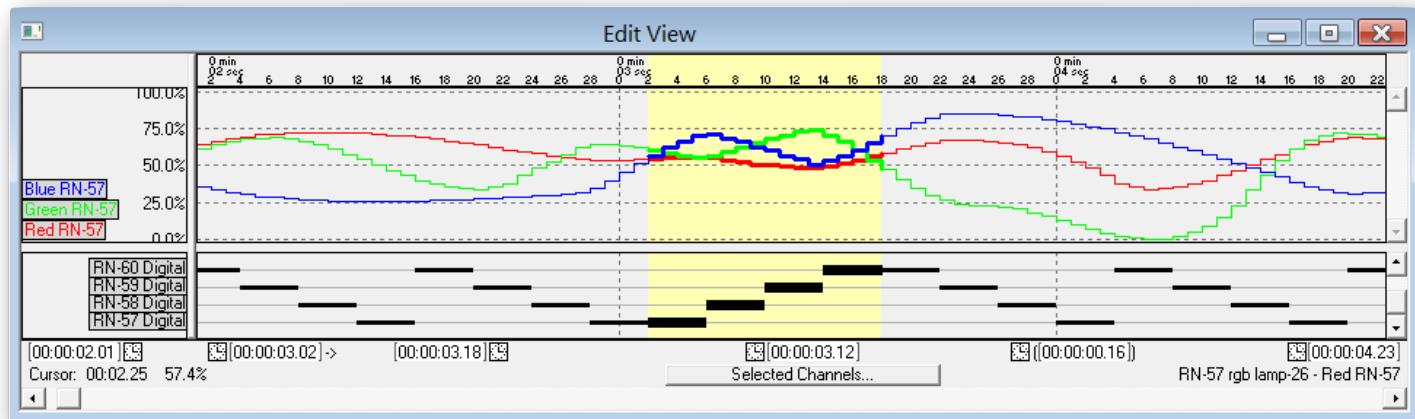
### **Reverse events in time.....**

Now that you have a bunch of staircases, select one or more of them by LeftClicking anywhere except on the channels. Slide to the left or right until you have a complete sequence of steps



selected, then release the left mouse button. This selects all the channels that are

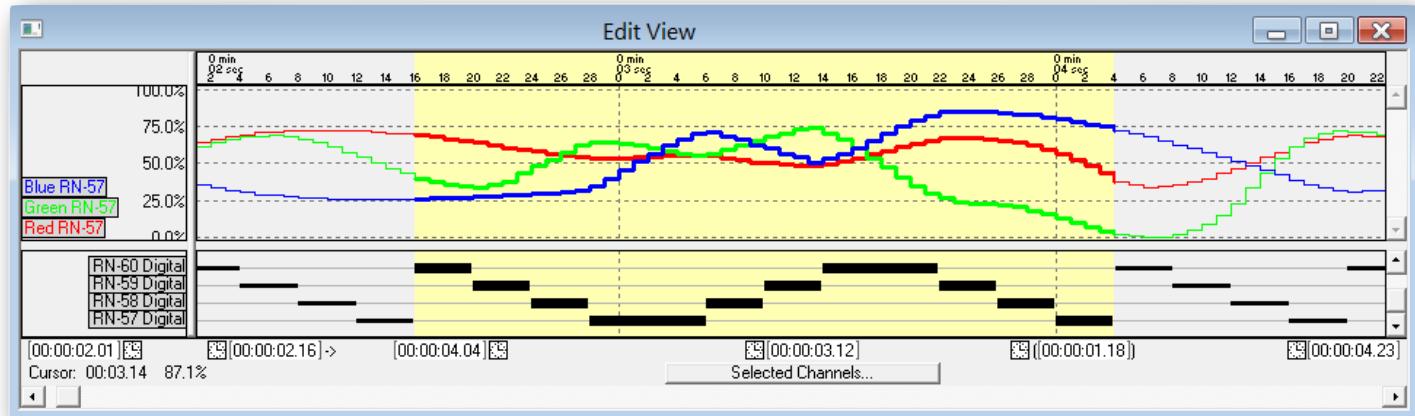
currently displayed on the OffLine Editing Window. Now select and '[Edit](#)' menu's



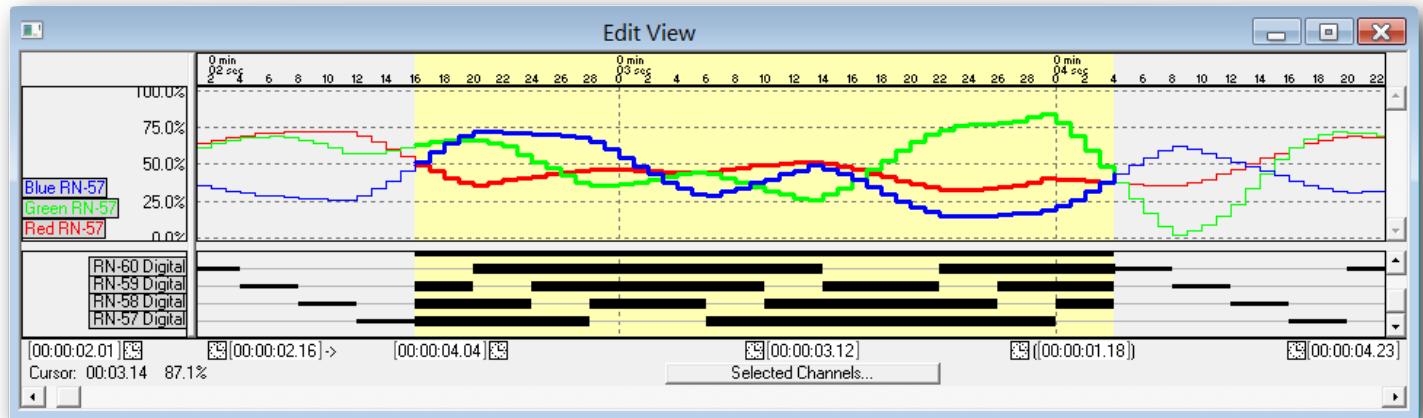
'Reverse' command. The selected stairway will now be reversed.

### Flip your show on its head.....

It invert command simply invert what you have displayed on the OffLine Editing Window. If digits are ON, it will turn them OFF. If digits are OFF, it will turn them ON. If an analog value is at 25% before inverting, it will be at 75% after. The first illustration is the show before inverting:



Invoke the '[Edit](#)' menu's 'Invert' command (shortcut: <Control>+I) The second illustration is the show after inverting the selected area of time. All the analog and digital functions were selected, so both were inverted:

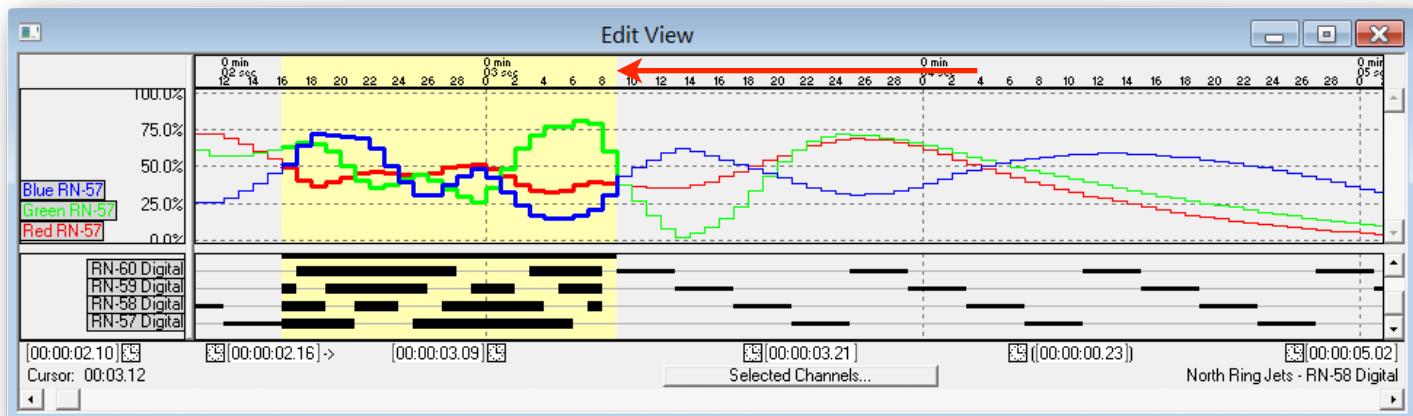


Note that the analogs were automatically ‘cleaned up’ at each end of the inversion by the [‘Preferences’ menu’s ‘Cut/Paste Options’](#).

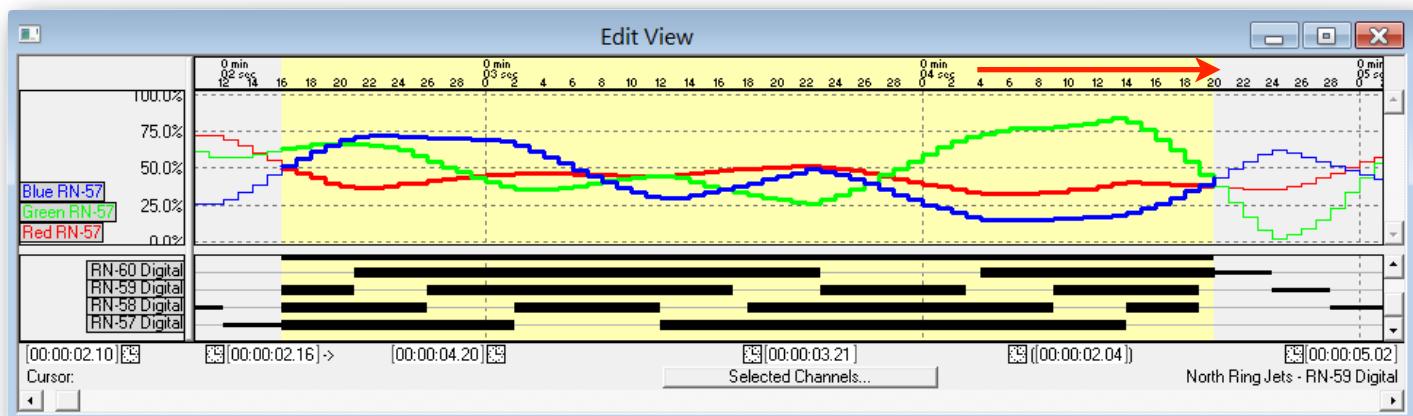
**Hint:** If an analog function is at 0%, the invert command is often the quickest way to set it to 100%, since it can be done with one hot-key press (shortcut: <Control>+I).

## Stretch and compress time.....

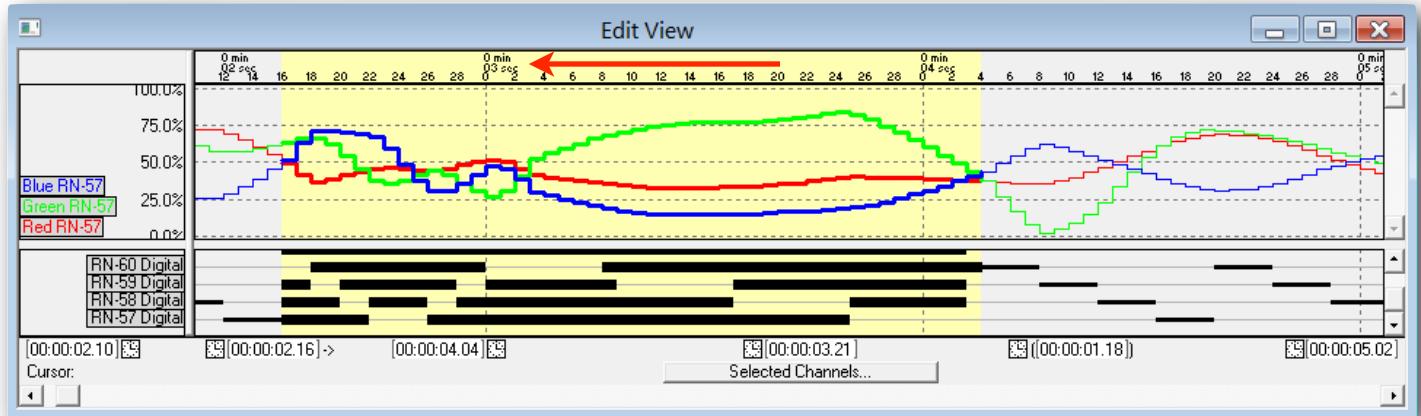
Starting with the previous illustration, with one or more channel selected, you can then change the amount of time it takes for the movement to take place. To do this, move the cursor up into the time bar. As you do, you will see the cursor change into an 'I' beam. If you RightClick and slide the mouse to the left, the selected channels will be compressed when you release the button. The data after the edit will slide forward in time to make room for your changes.



If you RightClick and slide the mouse to the right, the data will be stretched. The data after the edit will slide backwards in time to make room for your changes:



If you RightClick somewhere in the middle of the selected area of time, you can slide left or right. The side you slide towards will be compressed while the data on the other side of the selected point will be stretched. In this case the mouse was slid towards the left, so the left side of the selected time was compressed, and the right stretched. Data outside of the selected area remains unchanged.

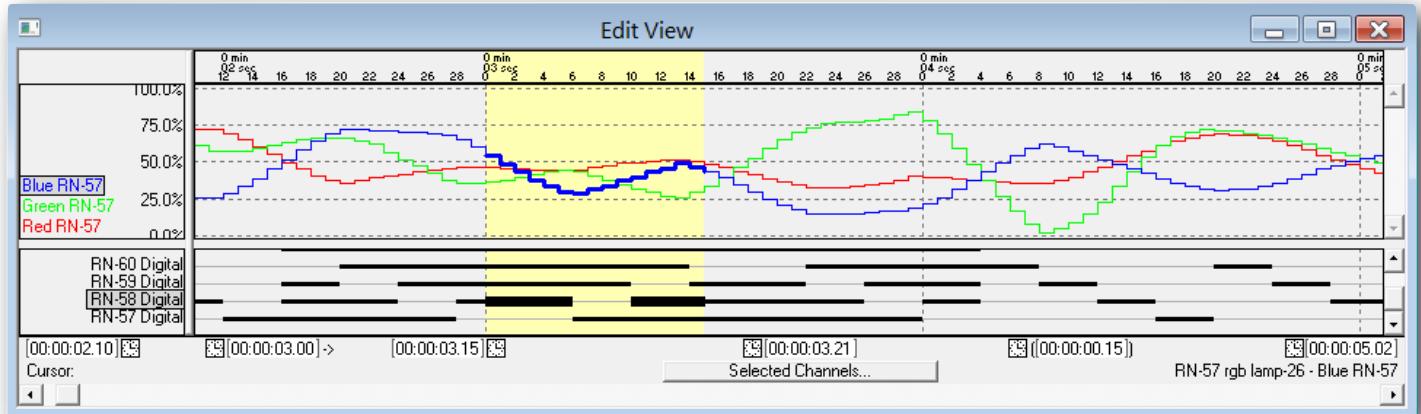


Analog functions are interpolated when you stretch or compress them, so they come out fairly cleanly. There aren't a lot of points between 'On' and 'Off' on a digital function, so you may see some rounding errors on the digital functions. You can minimize this by changing the new time to an even multiple of the original time.

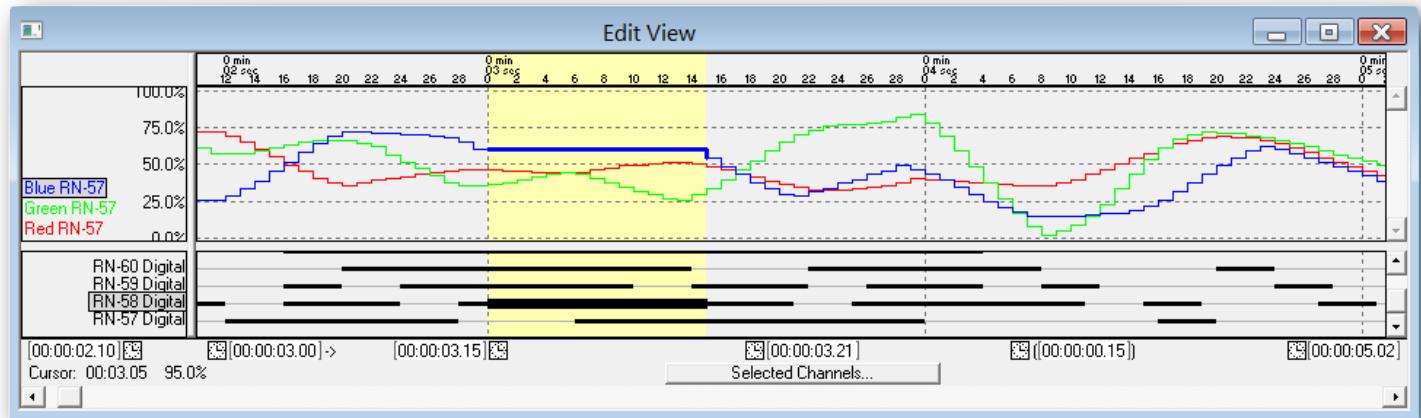
The stretching and compressing is an easy way to align animation data to the Audio/Video tracks.

### Adding and subtracting time.....

If a movement happens too soon or late, you may need to shift it in time. Select one or more channels for one or more frames worth of time. You can see by the 'delta' time, that fifteen frames worth of time have been selected for the blue analog and one of the digitals:

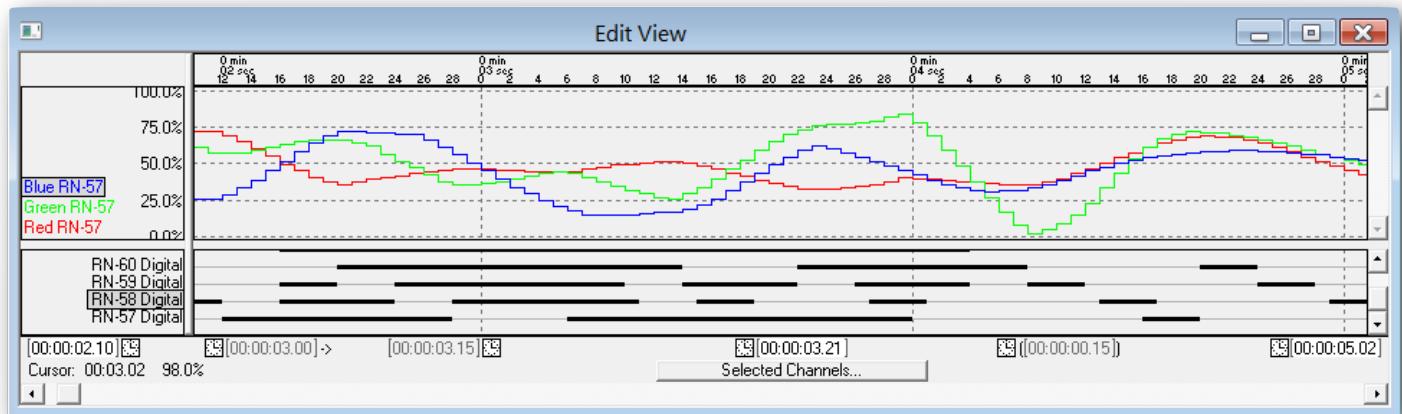


Use the ['Edit' menu's 'Add time'](#) to move the selected channels to a later time (in this case, by fifteen frames):



Use the '[Edit](#)' menu's 'Delete time' if you need the actions to happen sooner.

The selected output(s) will shift by the number of frames you have selected (also in this example by fifteen frames):

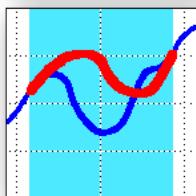
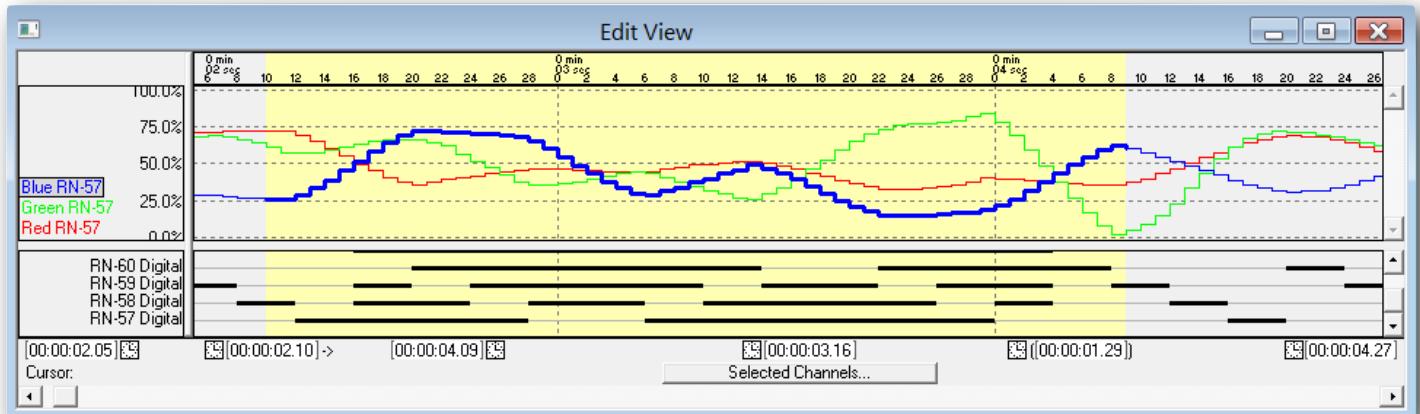


Note that the analogs were automatically 'cleaned up' at each end of the inversion by the '[Preferences](#)' menu's 'Cut/Paste Options'.

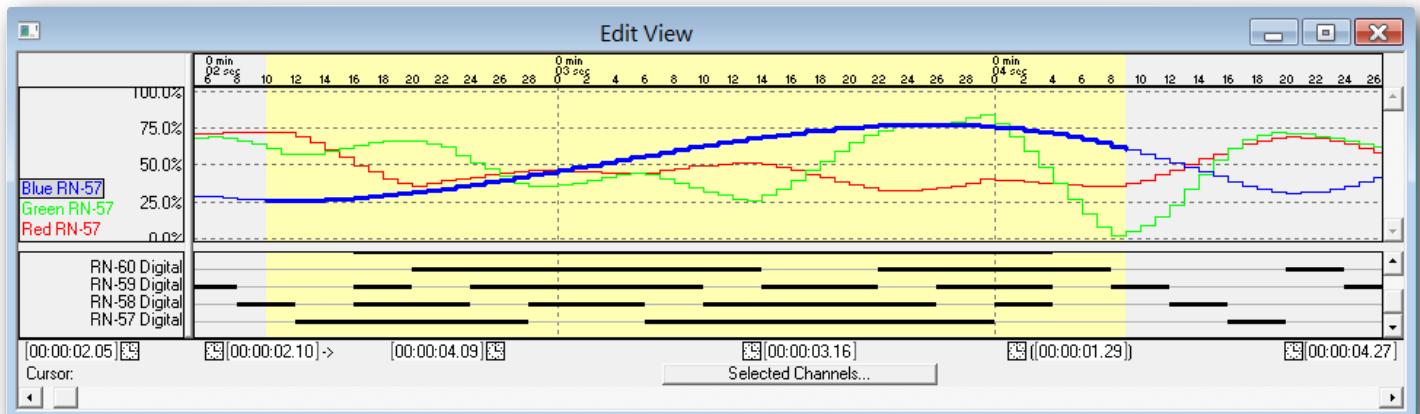
## Generating a ramp between two points.....

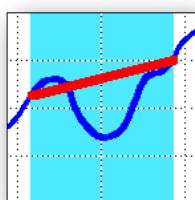
*If you are only using digital channels, you should skip this step.*

Select one or more analog channels for one or more frames worth of time:



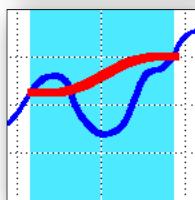
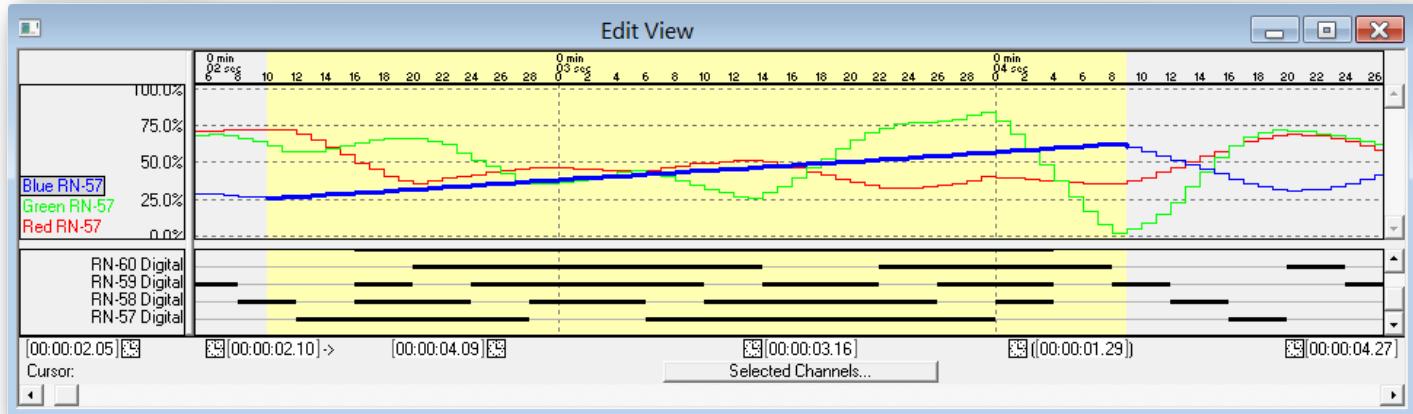
Select the '[Edit](#)' menu's Inbetween command (shortcut: [F10]). A ramp will be generated from whatever levels the analogs are at the beginning of the selected area to whatever level they are at the end of the selected area. The spline option will blend the curve into the data outside of the actual edit area:





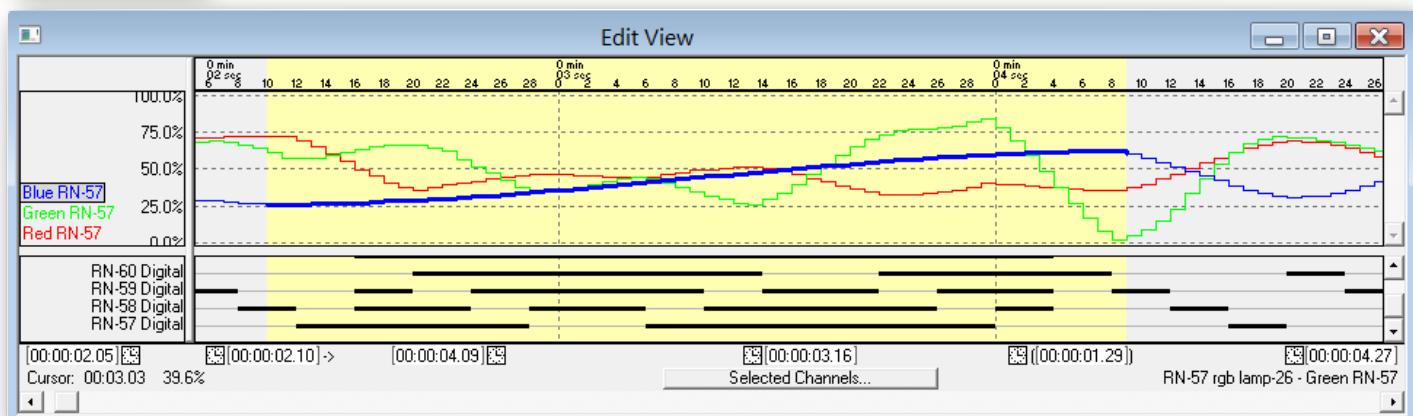
The ‘Linear’ generates ramps that are straight lines. This is usually the only type of curve available from most other control systems and lighting boards:

When set to ‘Curve’, the ramp starts and ends with the ends level. On



shorter selection lengths, this curve looks like an ‘S’, so it is sometimes also called an ‘S-Curve’:

The type of curve used for the ramp is set on the [‘Preferences’ menu’s](#)



[Inbetweening](#) dialog, or by using the [‘Edit’ menu’s ‘Setup & Inbetween’ command.](#)

## Copying from digital channels to analog channels.....

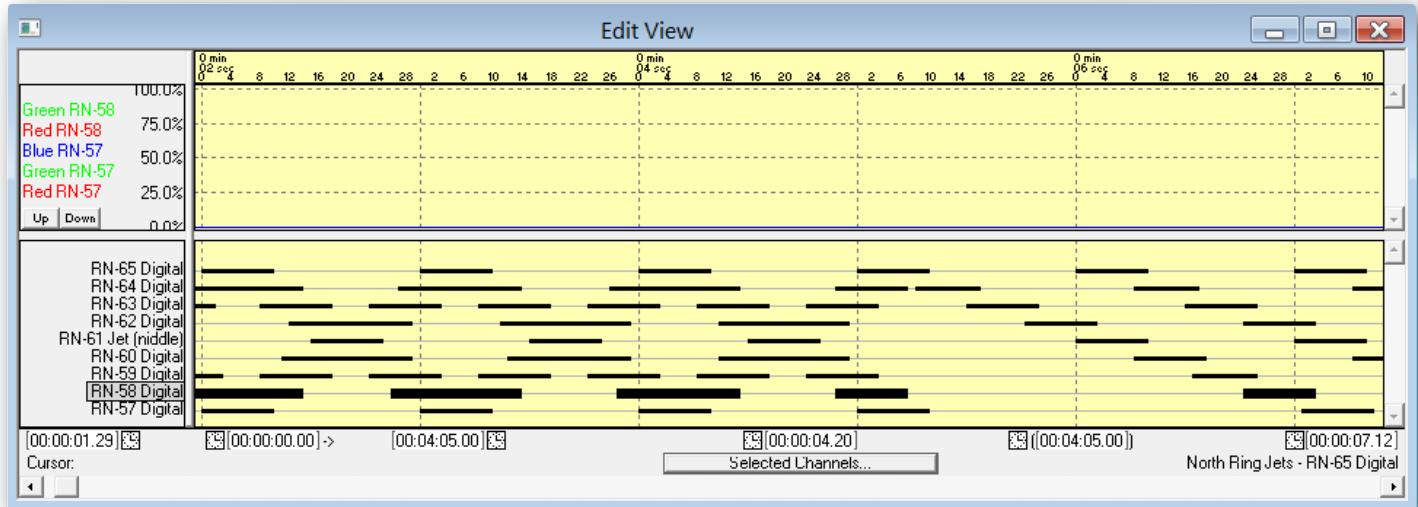
If you haven't added both analog and digital channels to your show, you should skip this step.

Pc•MACs supports resolutions from a one bit digital all the way up to a 32 bit analog. You can paste analogs between any resolution, and even into digital channels. You can also paste from digital channels into analog channels, which is covered in the next QuickStart.

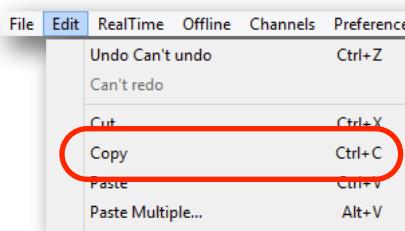
This is often used for programming chases in lighting channels, or on fountains where the water jet's valves are typically digitals, and the lighting for each water jet is typically an RGB LED fixture.

In this example, nine jets have been programmed in a series of chase patterns using the digital rubberbanding tools. In the real world, all nine channels would be pasted at once, but for clarity in this example, only one digital will be pasted into one color of the matching jet's RGB fixture.

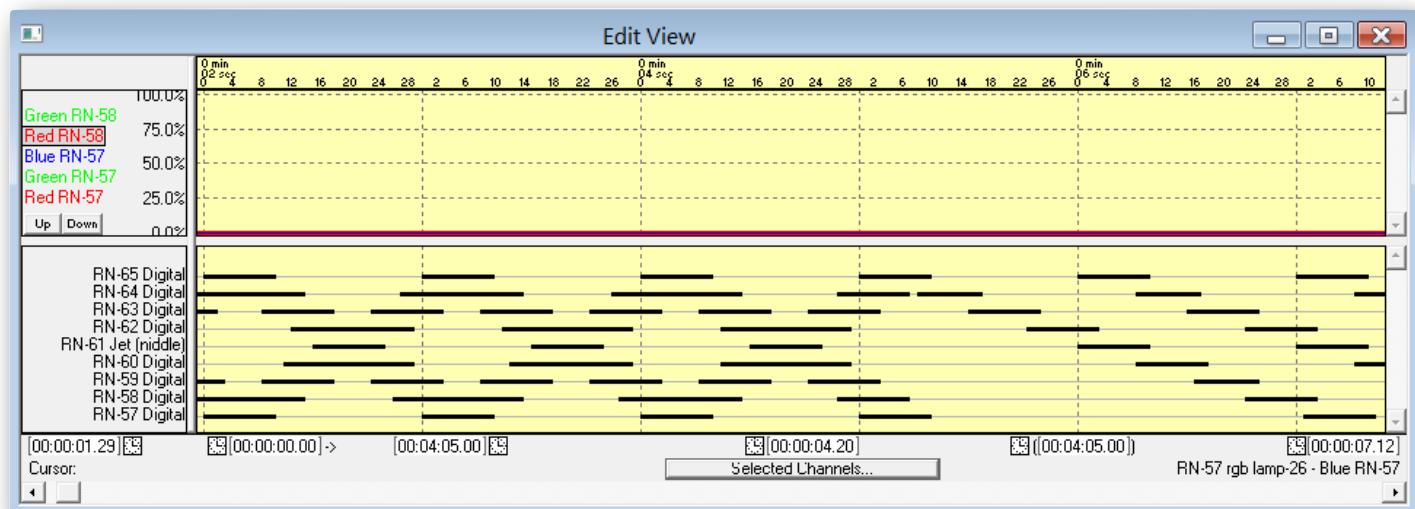
Select only 'RN-58 Digital'. In this case, we have selected this for the entire length of the show. We will be pasting this into the RED channel of this jets RGB light fixture:



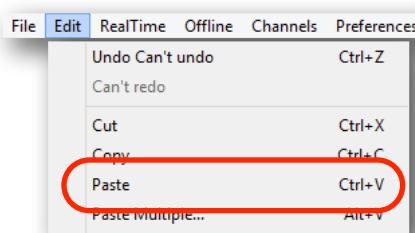
Copy (shortcut: <Control>+C) the data from this digital:



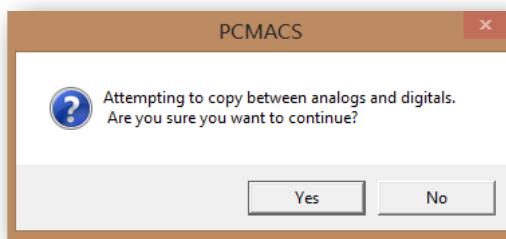
Select the RED lamp only from the RN-58's RGB lamp:



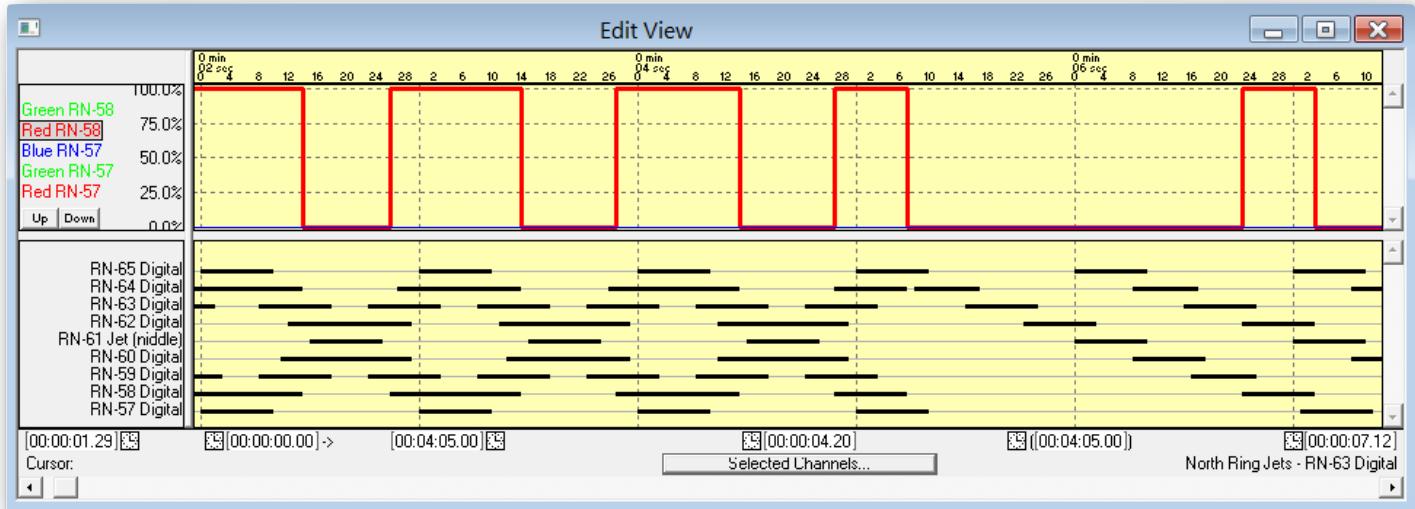
Select 'paste' (shortcut: <Control>+V)



Pc•MACs will warn you that you are pasting from digitals into analogs. Because that's what you want to do, click 'Yes':



If the '[Preferences](#)' menu's '[Cut/Paste Options](#)' are set to 'none'/'none', the digitals will go into the analog channels as square waves. We will do this first just to show what it looks like

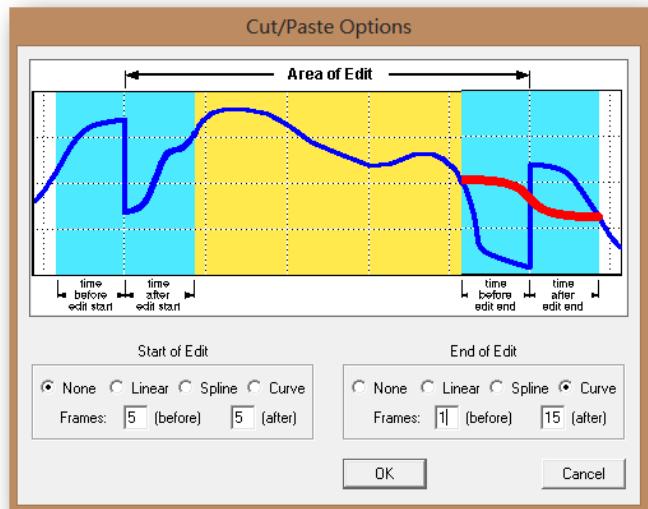


You are unlikely to want square waves in your lighting channels. The '[Preferences](#)' menu's '[Cut/Paste Options](#)' can fix this for you. The area shown as the 'Area of Edit' is the area where the analog is at 100% in the previous illustration.

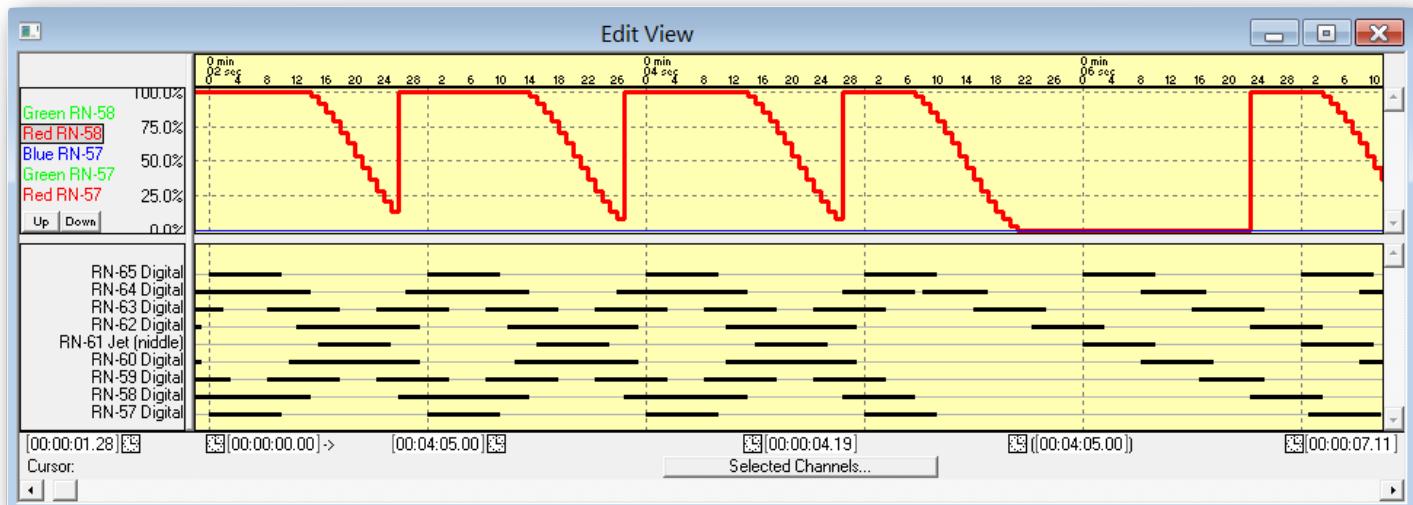
The 'Cut/Paste' settings for the 'Start of Edit' at the left of the dialog control the 'rising' edge (where it steps from 0% to 100%) of the data we are pasting in. The 'area before the edit start' is the area that leads the solenoid valve turning on. The larger this time is, the earlier the light will begin fading up. The 'area after the edit start' will eat into the area where the light would normally be at 100% in the previous illustration.

The 'Cut/Paste' settings for the 'End of Edit' at the right of the dialog control the 'rising' edge (where it steps from 0% to 100%) of the data we are pasting in. The 'area before the edit end' will eat into the area where the light would normally be at 100% in the previous illustration. The larger this time is, the earlier the light will begin fading up. The 'area after the edit end' is the area after the solenoid valve has turned off.

We will adjust the '[Cut/Paste Options](#)' for an immediate rising edge, and a half second (15 frames) fade out at the end of each waveform and repeat the paste.



Because the data copied from the digital channel is already in the clipboard, we can just do another ‘paste’. Pc•MACs will warn you (once again) that you are pasting between analogs and digits. Answer ‘OK’ and the result will be:

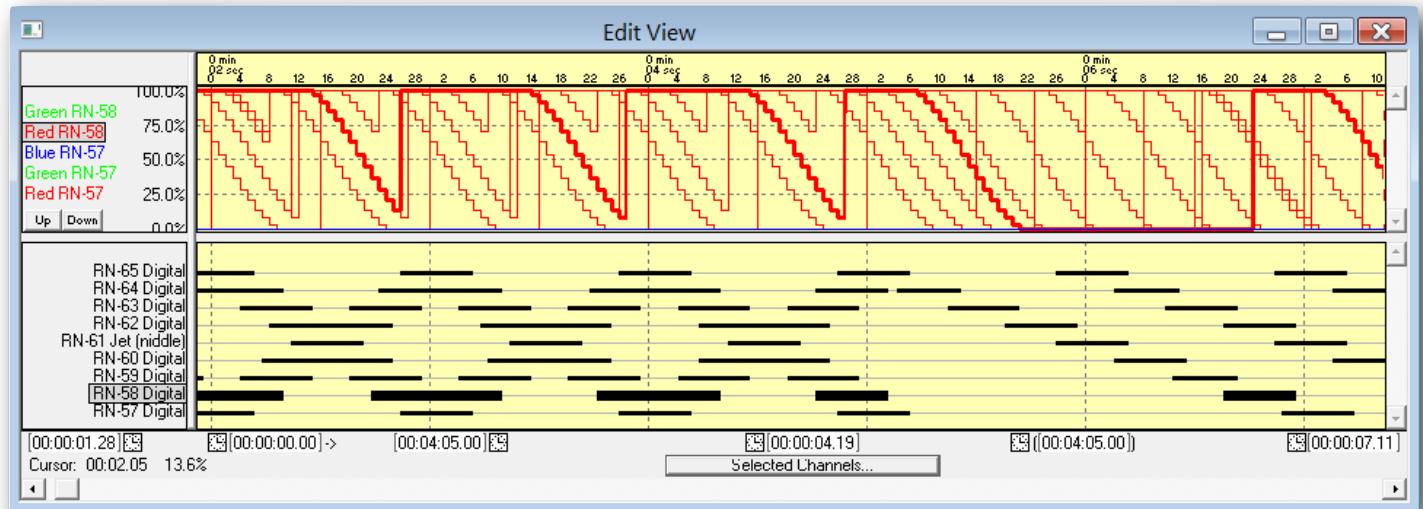


Because we didn’t add a fade in at the start of each waveform, the timing has not changed on the rising edges. With a half second fade out on the falling edges of the waveform, you can see that lights will stay at 100% for the same duration as before, and then fade out over a half of a second. If the next pulse happens before the light has reached 0%, it will jump back up to 100%.

In a real fountain, there is always a slight delay from the time you turn on the solenoid, and the water starts to come out of the nozzle. This is typically between three and fifteen frames, but can get in to seconds with some large valves.

If it is a musical fountain, the lights are typically programmed on the beat, and the solenoids are programmed to lead the beat by a few frames. You can compensate for this by using the ‘start of Edit’ settings on the [‘Cut/Paste Options’ dialog](#), or by shifting the solenoid commands forward in time by a few frames by selecting the amount you want to shift the digits by near the front of the show, and using the [‘Edit’ menu’s ‘Delete Time’ command](#).

As mentioned earlier, it is typical to copy and paste all the jets in a water feature simultaneously. Here is the same nine jets and nine lights, with the digital outputs that trigger the jets leading the lights by four frames to allow for the time it takes for the water to leave the nozzle after the solenoids are triggered:



The RN-58 jet and red LED are highlighted, just to make them easier to pick out from the crowd.

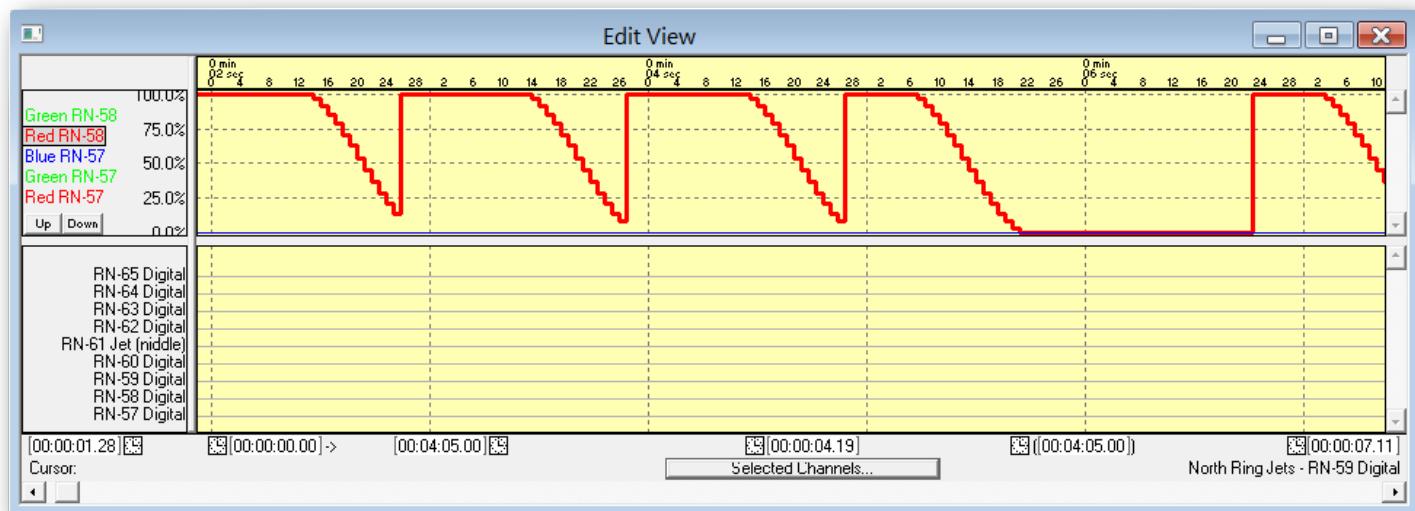
## Copying from analog channels to digital channels.....

If you haven't added both analog and digital channels to your show, you should skip this step.

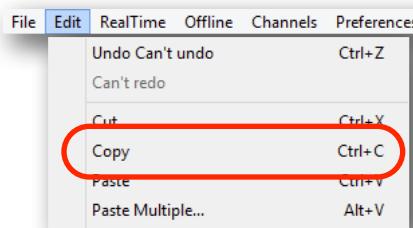
This section describes what is the opposite of what was described in the previous QuickStart 'Copying from digital channels to analog channels'.

When copying from an analog channel into a digital channel, the digital will be ON whenever the analog exceeds a 50% command value. The settings of the '[Preferences](#)' menu's '[Cut/Paste Options](#)' have no effect when copying from analogs to digitals.

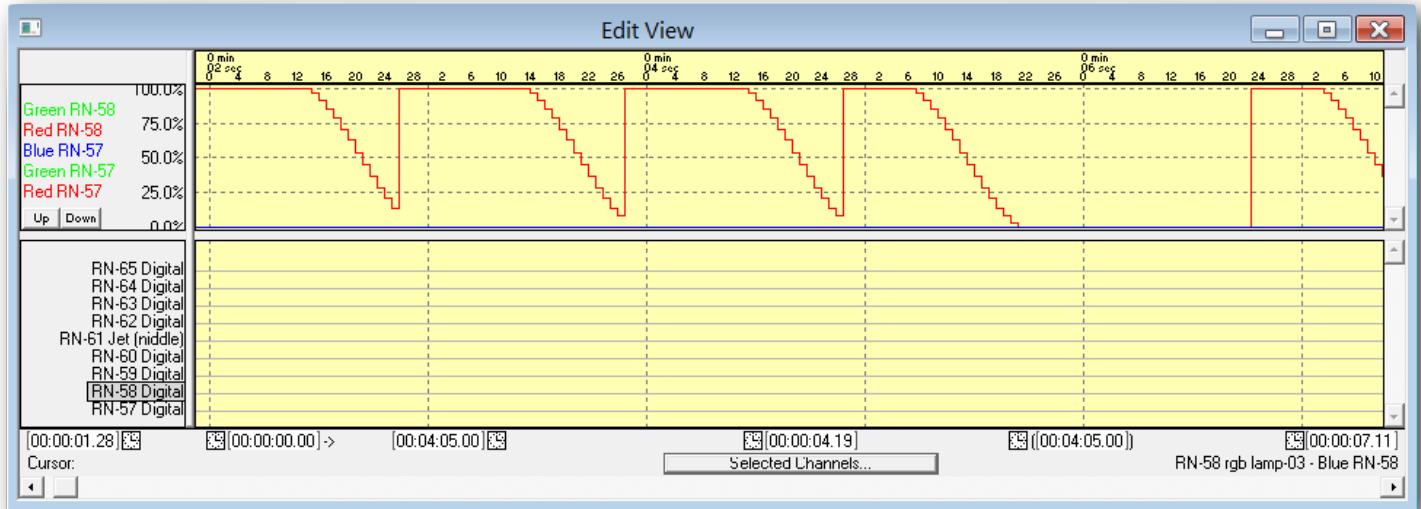
Select one or more analog channels for the analog source data. In this case, only one channel has been selected for clarity:



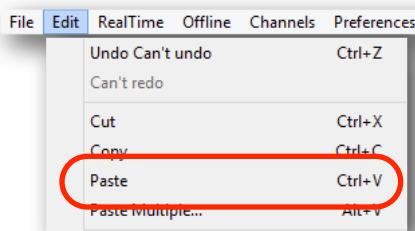
Select the '[Edit](#)' menu's 'Copy' command (shortcut: <Control>+C):



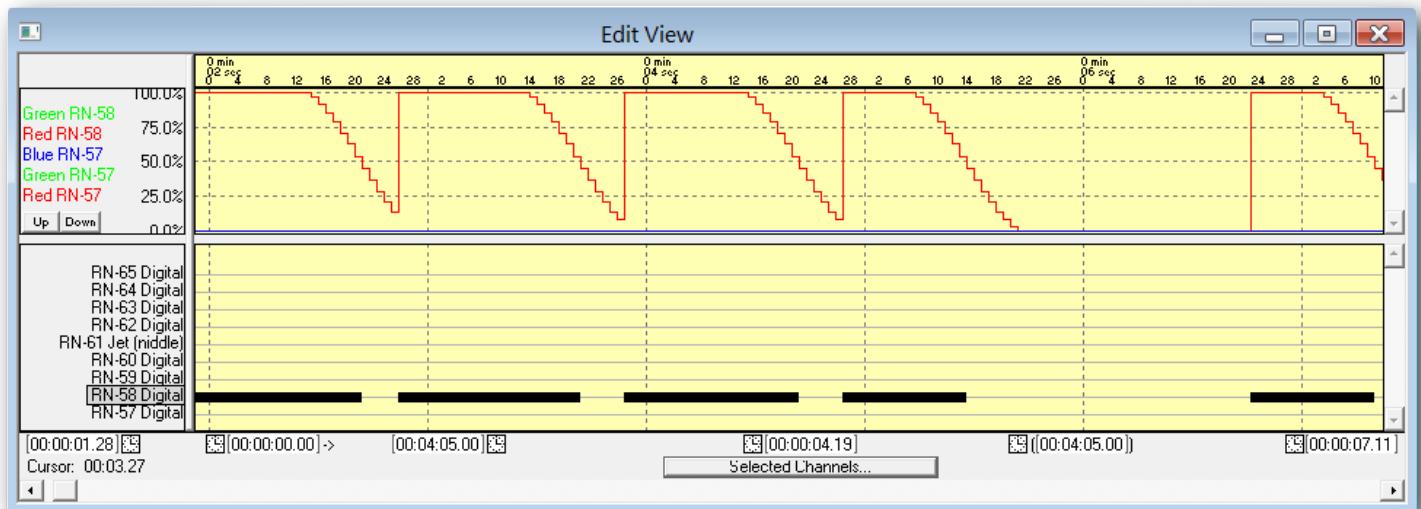
Now select a matching number of digital channels as the destination for this data (in this case this is just one channel):



Select the '[Edit](#)' menu's 'Paste' command (shortcut: <Control>+V):



The analog data is now in the digital channel:



As you can see, the beginnings and ends of the digital function's lines are aligned with the points where the source analog function crossed the 50% level.

## Copying from Audio/Video tracks to analog or digital channels.....

*If you haven't added any Audio/Video files to your show, you should skip this step.*

The '[Edit](#)' menu's '[Yak](#)' command is used to copy an audio waveform and paste it into analog or digital outputs. This can be used to rough out a mouth movement on an animatronic figure, or to program jets in a fountain to follow the music. We have had dozens of applications where a lightning or explosion effect have the lights programmed by pasting in the sound form the thunder or explosion. Where static figures are used in a museum displays, we have modulated their lights using the voice tracks of the characters as they 'speak'.

Before you invoke the '[Edit](#)' menu's '[Yak](#)' command, you must have an audio file (or a VideoFile with sound) loaded in your show and the waveform displayed on the OffLine Editing Window. Select the analog and/or digital channel you want to use as the destination for the '[Yak](#)' function. In this example we will choose one analog channel and one digital channel:

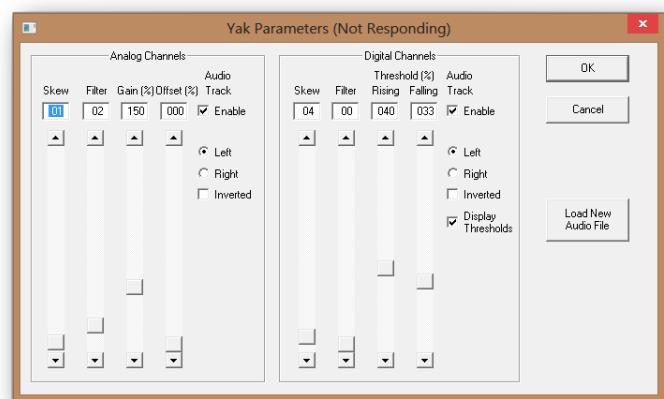


The shortcut for the '[Edit](#)' menu's '[Yak](#)' command is <Control>+Y:

To '[Yak](#)' analog functions, the settings on the left of the dialog are used:

**Skew:** This offsets the resulting data forward in time to lead the audio. Lights typically need little or new skew. Solenoids typically need 3 to 15 frames of lead time.

**Filter:** This keeps the resulting waveform from looking too much like the New York City skyline. LEDs have zero inertial mass, so they can turn on and off rapidly. Motors and other mechanical



devices need a little more time to overcome inertia.

**Gain:** Amplifies the audio waveform to give you the desired output amplitude.

**Offset:** This shifts the resulting waveform upwards, so that it never goes all the way to OFF. Typically used with lighting to keep it from turning all the way off between sounds.

To 'Yak' digital functions, the settings on the right of the dialog are used:

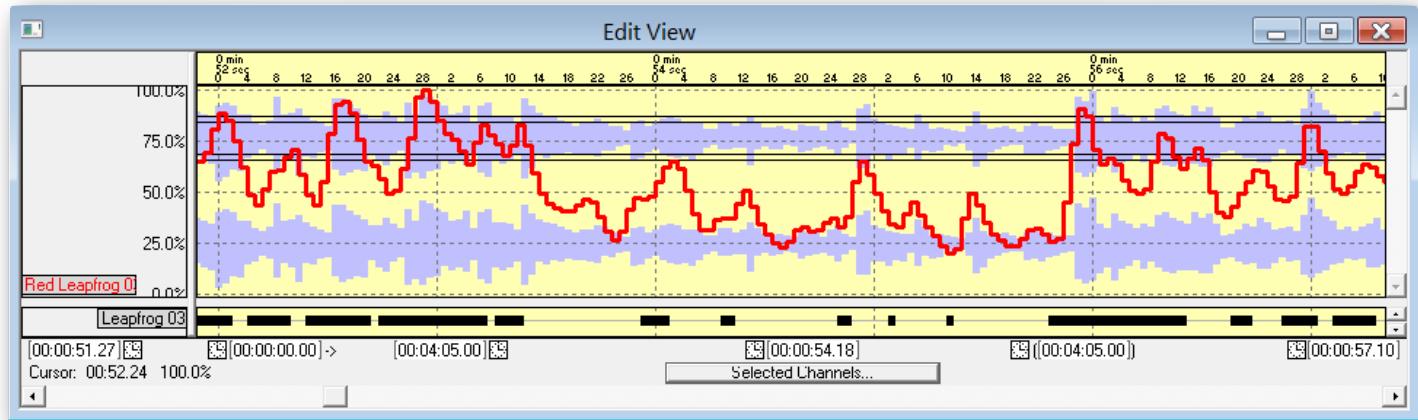
**Skew:** This offsets the resulting data forward in time to lead the audio. Lights typically need little or no skew. Solenoids typically need 3 to 15 frames of lead time.

**Filter:** This keeps the resulting waveform from looking too much like the New York City skyline. LEDs have zero inertial mass, so they can turn on and off rapidly. Motors and other mechanical devices don't.

**Rising Threshold:** This is the audio level where the digital will turn ON.

**Falling Threshold:** This is the audio level where the digital will turn OFF. This is normally set to a level lower than the Rising Threshold.

You also have the option of displaying the rising and falling edge thresholds on the OffLine Editing Window. You can see this in the next illustration on the 'Left' (upper) audio waveform. There are also options to select and load a new SoundFile, to invert the results, and whether to use the right or left audio channel for the waveform.



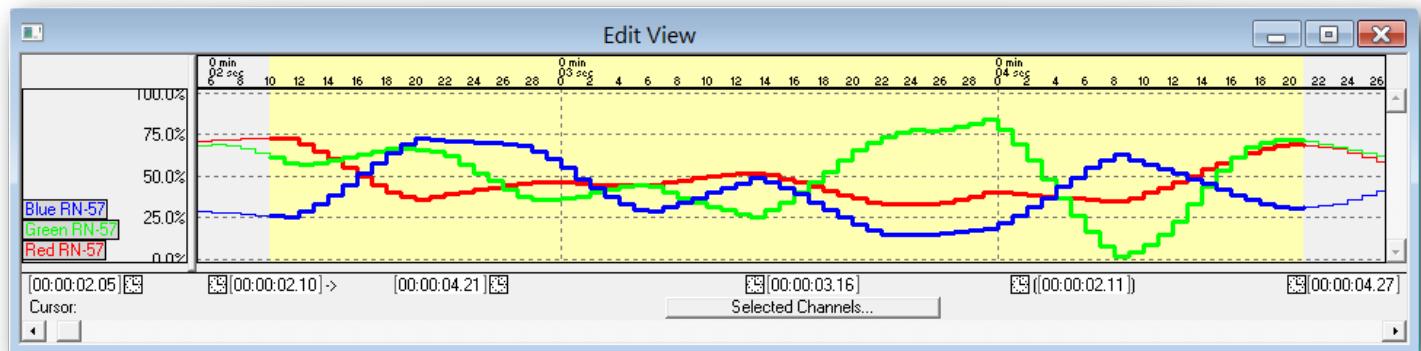
These are the resulting analog and digital outputs created by the 'Yak' parameters shown above.

## Ramp analogs to a color.....

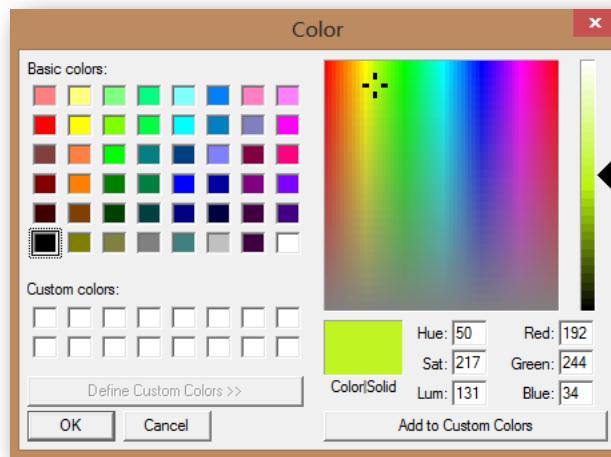
If you haven't added any RGB lighting fixtures to your show, you should skip this step.

If you are programming RGB lights, you will want to ramp them to specific colors. Be aware that many RGB lights are not well calibrated. You should confirm that the colors of your lights match the colors that you are trying to set them to.

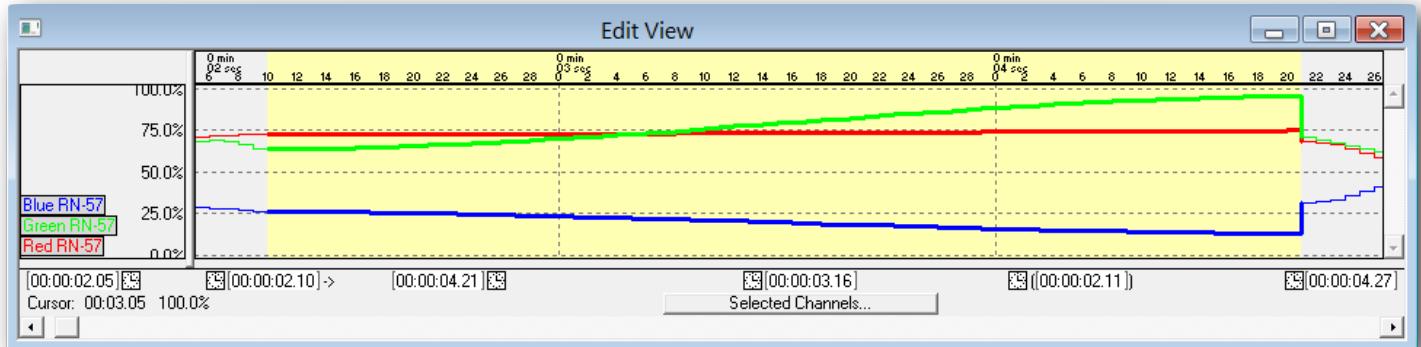
Select the amount of time that you want to take for your ramp. You can select any number of RGB lamps, and ramp them all at the same time:



Select the '[Edit](#)' menu's 'Ramp to a Color...' command and pick the type of ramp you would like to use. This opens a standard Windows color picker:



Be sure to set the 'brightness' control at the right of the color picker, or else it will only generate ramps to 'black'. Set the color you would like to see. When you click 'OK' the ramp will be created.



At the end of the ramp time, the lights will be at the desired levels. You can use the fill command to extend these levels for as long as needed, or use the same 'Ramp to a Color' command to ramp to a different color. Note that in this example, the 'Curve' ramp setting was used, and the '[Cut/Paste Options](#)' were turned off from the '[Preferences](#)' menu. This was so that Pc•MACs wouldn't automatically blend the end of the ramp into the existing RGB levels.

If you want to use this color regularly, you can add it to the list of 'Custom Colors' by simply pressing the 'Add to Custom Colors' button on the color picker.

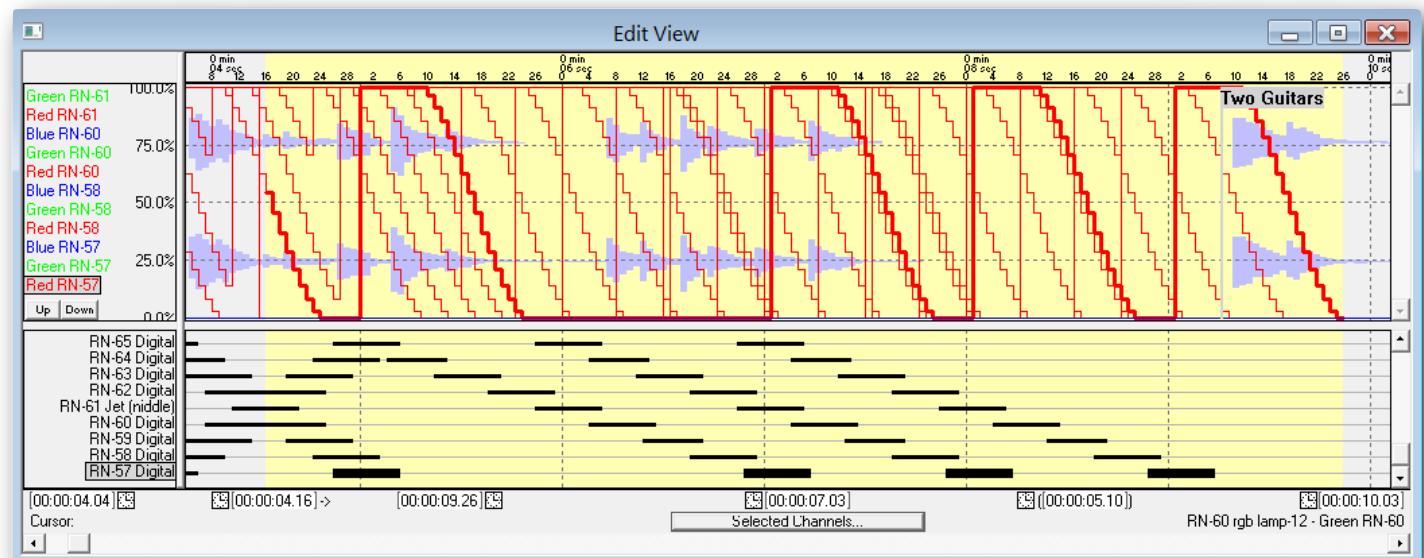
If you find your lights are not well calibrated and the colors you choose are nothing like the colors you see on your RGB lamps, you can use the soft console to control the individual RGB channels to find the colors that you want. Once found, transfer the RGB numeric values to the Red, Green and Blue entries on the Windows Color Picker, and immediately save that color as a 'Custom Color' so you can get back to it at any time in the future.

## Scale Analogs without stopping patterns.....

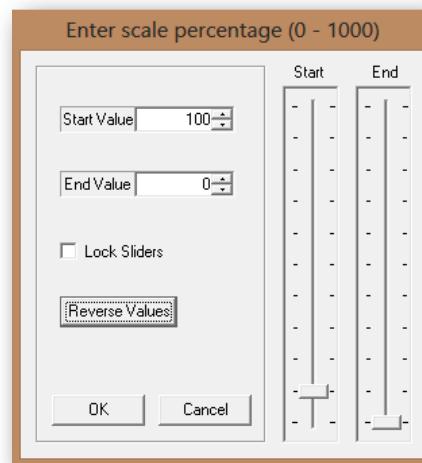
*If you haven't added any analog channels to your show, you should skip this step.*

If we have a chase or any other pattern that we have programmed into the analog functions, we can change the level of the analogs without changing what they are doing by using the ['Edit' menu's 'Scale by Percentage' command](#).

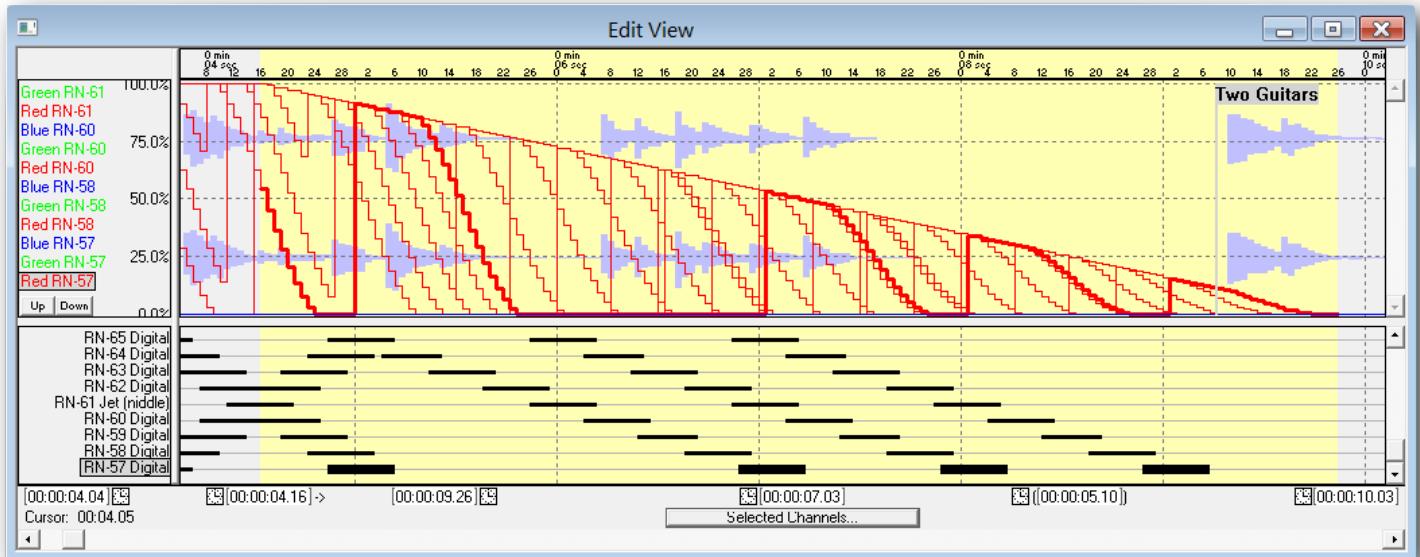
In this case, we have a chase pattern on a set of fountain jets, and the lights are programmed to match. You can fade these in, fade them out, or just reduce or increase the analog values, all without changing what they have already been programmed to do. Just select the area for the edit. In this case it is 5-1/3 seconds. One of the analog channels (and the digital it was copied from) are highlighted so you can see what it looks like 'before'.



Open the ['Edit' menu's 'Scale by Percentage' command](#) (shortcut: <Control>+4).



You can enter the scaling values either numerically or by moving the sliders. When you first open the dialog, the values are locked, so they move together. Equal values are used to scale the length of the selected area evenly. To fade in and out, you set one to a high value, and the other to a low value. In this case, we will be doing a fade out, so we will start with 100% and end at 0%:



The same channels are highlighted so you can see what is happening with the analog during the fade. If you wanted to 'fade in' instead of 'fade out', you can just hit the 'Reverse Values' button to swap the starting and ending percentages.

### More ways to modify a digital channel.....

*If you are only using analog channels, you may want to skip this step.*

Select one or more digital channels for one or more frames worth of time. Under the ['Edit' menu](#) you can select the following commands to:

- '**Clear to Default Values**': Sets any selected digital(s) back to their default values (set for each digital channel under the [Channels List](#)). You can also use the 'Delete' key on your keyboard as a shortcut to this command.
- '**Fill with First Value**': The value at the start of the selected area is used to fill in the rest of it.
- '**Set Digitals Off**': The selected digital function(s) are turned 'Off' in the selected area.
- '**Set Digitals On**': The selected digital function(s) are turned 'On' in the selected area.

## More ways to modify an analog channel.....

*If you are only using digital channels, you may want to skip this step.*

Select one or more analog channels for one or more frames worth of time. Under the '[Edit](#)' menu you can select the following commands to:

- a) '**Clear to Default Values**': Sets any selected analog(s) back to their default values (set for each channel under the [Channels List](#)). You can also use the 'Delete' key on your keyboard as a shortcut to this command.
- b) '**Fill with First Value**': The value at the start of the selected area is used to fill in the rest of it.
- c) '**Set Analogs to a Value...**': You can enter a value for the selected analog(s).
- d) '**Ramp to a value...**': You enter the ending value for a ramp. A ramp is generated from the existing value at the start of the selected area to the value you enter at the end of the selected area.
- e) '**Smooth**': This command applies a filter to the selected analog channel(s). This will remove any jitter, and smooth out the highs and lows in an analog channel. The value of this filter is set under the '[Preferences](#)' menu's 'Smoothing' dialog. A larger value will filter more. Each time you apply the filter to the same analog, it will be filtered more. Eventually, you will end up with a flat line.

## Save your show (again).....

Now that you have something programmed, you can now download it to the Bricks you are using. You should save your work using the '[File](#)' menu's 'Save' command. If you don't, Pc•MACs will not let you download the show in the next step.

## AutoDownload your show.....

If you have a program-in-place Brick attached to your PC, you will now want to try out the AutoDownload functions of Pc•MACs. Jump forward to the '[AutoDownload Quick Start](#)' section of this manual to give it a try!

## OffLine Editing Window Rules to remember.....

- 1) **Channels and time are selected by clicking with the left mouse button.**
- 2) **If you LeftClick ON a channel, that ONE channel will be selected. If you click any where BUT on a channel, ALL of the channels on the OffLine Editing Window will be selected.**
- 3) **Channels are modified by using the right mouse button.**
- 4) **Only the selected channels will be effected by any editing command.**  
Channels that are not being displayed on the OffLine Editing Window, or channels that are not selected, will never be effected by any editing command that you apply on the OffLine Editing Window.

## RealTime Programming Your Show

This section presumes that you have already attached your serial port and/or MACs-License and DMX-512 port to your [Target Device\(s\)](#), and told Pc•MACs about them. This is one of the first items covered at the beginning of all the QuickStarts.

Without a PC•MACs MACs-License, you can program the first sixteen channels (128 digits, 16 analog channels, or a combination of the two) in RealTime by connecting your [Target Device\(s\)](#) to your PC's serial port (USB-to-Rs232/422 or [C-USB-RS232](#)). For an Sd-50 or Pb-DMX/nn you will also need a [Mp3-50/CBL](#). If you have DMX-512 'slaves' connected to [Target Device](#), it will translate the first 16 channels of serial data it receives into DMX-512, and sent it to the DMX-512 'slaves'. If you have DMX-512 data programmed into channels above sixteen, you won't see those channels play back until you AutoDownload your show to the [Target Device](#), and run the show from there.

With a MACs-License and one or more [USB-DMX512 Adapter](#), you can program hundreds or even thousands of channels. Each [USB-DMX512 Adapter](#) can control a full universe (512 channels) of equipment. Connect the DMX-512 output from the [USB-DMX512 Adapter](#) to your GilderGear show control system, and daisy chain the DMX-512 network to all the other DMX-512 gear in the system.

### Turn On Manual Mode.....

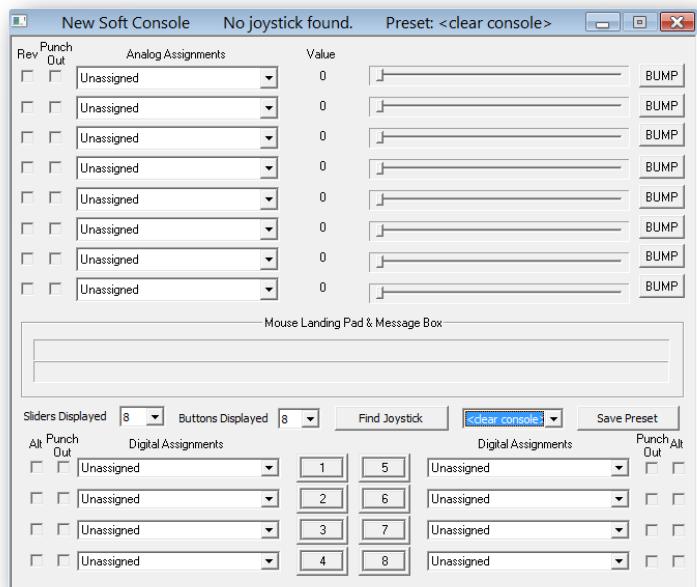
Turn ON Pc•MACs' 'Manual' mode checkbox. This can be found on under the ['RealTime' menu](#), and on the Main Control Window. The shortcut is [F3]). Turning ON the 'Manual' mode tells Pc•MACs to update all the show control outputs, even when the show is stopped. With Manual mode OFF, Pc•MACs will only update the outputs while Playing/Recording/Rehearsing a show. As soon as Manual mode is turned ON, you should see the transmit LEDs on the serial adapter and/or [USB-DMX512 Adapter](#) start blinking at the show's frame rate. The 'DMX' LEDs on all the attached GilderGear should also start flashing their DMX-512 reception indicators. If you click the 'Manual' mode back OFF, these LEDs should instantly stop flashing.

### Open the Soft Console.....

Open the Soft Console. The Soft Console can be opened from the ['Realtime' menu's](#) 'Show Soft Console' command, or by using the shortcut [F5]).

## Analogs at the Top.....

The upper half of the Soft Console is used for programming analog (0-100%) functions. You can select to display zero to eight analog functions at the same time. Once they are assigned, the sliders on the right can be moved using your mouse, or you can plug in an external USB-Slider console, USB-MbJoystick, USB-AtoD or gaming joystick and press the ‘Find Joystick’ button. You will no longer be able to move the sliders with your mouse that have been taken over by your external console/joystick. Move your console/joystick, and the sliders will move these sliders. The remaining sliders can still be moved using your mouse, as before.



## Digital at the Bottom.....

The lower half of the Soft Console is used to program digital (on/off) functions. You can display between eight and forty digital inputs at one time. The buttons can be pressed using your mouse on the screen, or using the numbers buttons one through eight (or one through ten if displaying ten inputs on the Soft Console). If a console/joystick is plugged in and recognized, you can use the buttons on the console/joystick in addition to the numeric buttons on your keyboard and buttons on the soft console.

## Assigning your Analog and Digital to the Soft Console.....

You can assign analog and digital functions to the Soft Console inputs by clicking on the drop-down and finding your channels. If you have put your analogs/digital outputs into folders, you will need to open these folders to locate your outputs. If you didn't put your outputs into folders, your outputs can be found inside the folder named ‘none’.

When you are assigning analog functions, you will only see the analogs outputs you added to the [Channels List](#) on the inputs' drop-downs.

When you are assigning Digital inputs, your will see your digital functions from the [Channels List](#), as well as 'Bumps' and 'Transport Commands'.

The 'Bumps' allow you to assign 'Bump' functions to the digital inputs. Just like the 'Bump' buttons adjacent to each of the analog sliders on the Soft Console. These instantly bump the sliders to 100% when pressed, and back down to the previous level when released. If in 'Manual Mode' and the 'EaselIn' checkboxes are both ON, the 'Bumps' will EaselIn and EaseOut when the Bumps are pressed and released. If you are recording, the 'Bump' will be recorded in the show with the EaselIns OFF. They will be recorded as square waves, with instantaneous jumps from 0% to 100% when pressed and back to 0% when released.

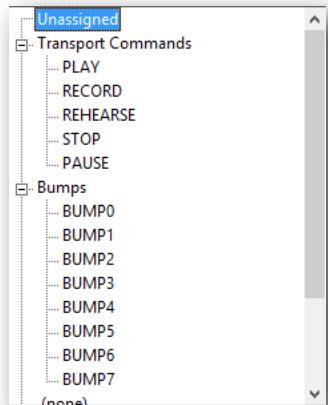
The 'Transport Commands' allow you to assign the basic transport commands found on the Main Control Window to the Soft Console (and to any attached external console or joystick). This saves you the trouble of reaching over to the keyboard and/or mouse to access these 'transport' commands. They can be right on the console where you are working.

### Test Drive the Soft Console.....

Once you have assigned your analog and digital outputs to the Soft Console, you can press the buttons and move the sliders. If 'Manual' mode is ON and the serial and/or DMX-512 cables are connected to the permanent control system, you will see your actions reflected in the output LEDs on the GilderGear, light fixtures and any other gear attached to the DMX-512 network.

Press the Digital buttons on the screen, and then use your keyboard numbers one through eight (or one through ten if your are displaying ten Digitals on the Soft Console). Also use the buttons on the external Console/Joystick, if you have one plugged in.

If you don't have a Console or Joystick plugged in, wiggle the analogs with your mouse. You can click right on a slider to move it, or just click on the 'Mouse Landing Pad' and you can control the first two enabled analogs with the mouse. Try out your joystick if you have one plugged in.



## Try recording something.....

If you go into ‘Record’ using the button on the Main Control Window, the command on the [‘Realtime’ menu](#), or the shortcut: <Control>+[F1]. Anything you do on the assigned analog and digital inputs will be reflected in the outputs. If your controller is attached to the whatever you are controlling, you will see it move as well. If your OffLine Editing Window is visible, you will also see these channels being drawn in as the show is recorded.

When you stop (shortcut: <space bar>) or the end of the show is reached, you can hit ‘play’ (shortcut: [F1]). Whatever you did on the Soft Console will be played back.

## Reverse, Alternate and Punch Out Checkboxes.....

The ‘Rev.’ checkbox adjacent the analog inputs flip the slider so that the zero end of the slider is on the right, instead of the normal left end.

Adjacent to the digital inputs, the ‘Alt.’ checkbox turns the digital input buttons from the normal momentary action to a ‘Push ON’/‘Push Off’ action.

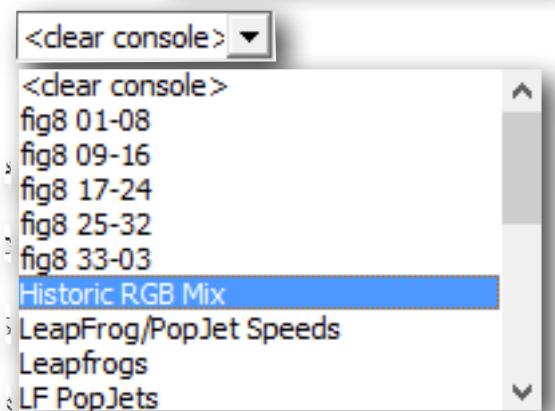
The ‘PunchOut’ checkboxes are used to disable the adjacent analog and/or digital inputs. When you are in ‘Record’ mode, these ‘Punched Out’ channels will be ignored and remain unchanged. You will see animation on the sliders and buttons, as if Pc•MACs is doing a Play. If you have already recorded a channel, you would typically ‘Punch Out’ those channels that you just recorded, so they are not overwritten on the next ‘Recording’ pass.

## Save and Recall Console Presets.....

Once you have the inputs assigned on the Soft Console, you can save the current setup as a ‘Console Preset’. Press the ‘Save Preset’ button. Enter the name for your new console preset. Make a few changes to the input assignments or checkboxes on the Soft Console and save another preset or two.

You can instantly switch between saved Soft Console Presets using the adjacent drop down.

**Hint:** Save a console preset called ‘<Clear Console>’ with nothing assigned to the Soft Console at all. It will save you time when you need to start a new console preset by clearing off whatever is on the Soft Console.



## AutoDownloading Shows

The final step in programming most shows is to generate an AutoDownload file to run on the permanent Show Control System. In this example, Pc•MACs has picked a Br-ANA as the '[Target Device](#)'. When the AutoDownload is complete, the AutoDownload file is moved to a Sd flash card which then gets plugged into (in this case) a Br-ANA.

Pc•MACs automates most of the AutoDownload process for you.

All you need to do is:

- 1. Open the '[File](#)' menu's '[Save to AutoDownload](#)' dialog:**

The [AutoDownload dialog](#) has four main sections:

- '[Target Device](#)': This is normally the DMX-512 'Master' for the installation
- '[Shows to Download to Target Device](#)': Shows used in the installation
- '[Sequencer Options](#)': What happens at powerup?
- '[Trigger Input Actions](#)': What inputs do what?

You start at the top of the dialog, and work your way to its bottom to complete your AutoDownload:

- 2. Pick the '[Target Device](#)' for this AutoDownload:**

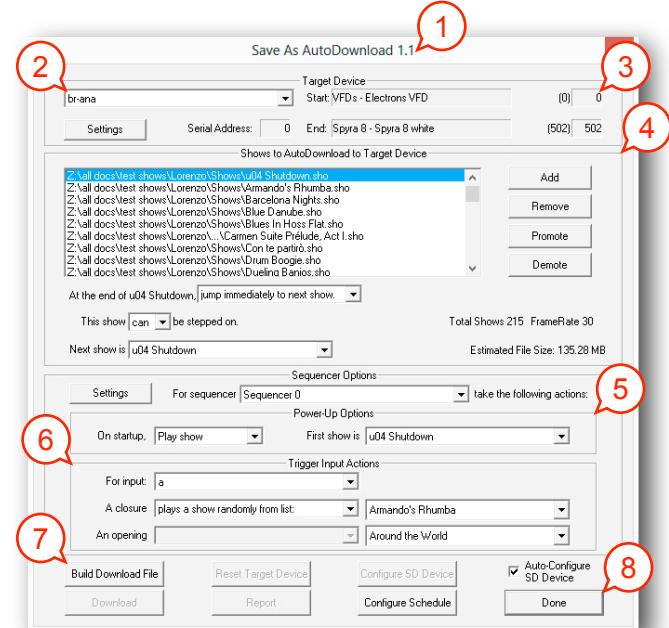
*You probably won't need to touch this. Pc•MACs has already set this for you.*

Pc•MACs automatically picks the most likely '[Target Device](#)' for your AutoDownload. If you want to build the AutoDownload file for another device in your [Channels List](#), just pick it from the drop-down.

- 3. Pick the Range of Channels for this AutoDownload:**

*You probably won't need to touch this. Pc•MACs has already set this for you.*

Unless you tell it otherwise, Pc•MACs will automatically download all the channels in your [Channels List](#), or at least as many as the [Target Device](#) can hold. You can pick the range of channels using either the name of the channel or DMX-512 address for the channel. In almost all cases, the value in the boxes should be equal to the



values shown just to their left (in parenthesis). The values in the parenthesis are the first and last DMX-512 addresses used in your [Channels List](#).

#### **4. Pick the ‘Shows to AutoDownload to Target Device’:**

This is the list of which shows will go into this AutoDownload file. You can reorder them as needed, and pick one or more show files at a time to set what happens at the end of the show, and whether it can be stepped upon (or not) by another show request coming in while it is still running, and what the ‘next’ show is.

#### **5. Set what the [Target Device](#) does on StartUp:**

Use this section to set which show gets loaded and what happens when power is applied to the [Target Device](#). It can play the show, or just load the first frame of data from your startup show and wait for the first trigger to arrive. Most shows use only a single sequencer. On Multi-Sequencer Shows, you can set this for each sequencer.

#### **6. Set what the [Target Device](#) does on each Trigger Input:**

Each [Target Device](#) has different numbers of trigger inputs, and different things it can do with them. You can pick one input at a time, and set what will happen on both the opening and closing edges of the input you have chosen. Most shows use only a single sequencer. On Multi-Sequencer Shows, you can set this for each sequencer.

#### **7. Build your AutoDownload file:**

Once you have completed all the settings, you can use the ‘Build Download File’ button to simply build the AutoDownload file. You can rename the AutoDownload file, or use the default name and location. Your previous files will be moved to the ‘old AutoDownloads’ folder.

The AutoDownload files by default will be stored in a folder Pc•MACs creates named ‘Download Files’ in the folder that holds your show(s). Inside of this will be a folder with the same name as the site file used for your shows. Inside this are the individual drag-n-drop folders for each ‘Target’ and/or Audio/Video device used in your shows. At the end of the AutoDownload, Pc•MACs automatically opens the [AutoDownload Target’s](#) folder for you. This makes it easy to drag the AutoDownload and set files to your flash card.

#### **8. Close the AutoDownload dialog:**

Once you have completed the AutoDownload, you can close the [AutoDownload dialog](#). All the settings will be saved for this [Target Device](#) as part of the site file for your shows. If you need to build the AutoDownload file again in a few minutes, or in a few decades, the settings will come back just as you left them when you reopen this dialog.

If you have used the drag-n-drop Audio/Video triggers in your shows, and have the ‘Auto Configure SD Device’ checked (it’s ‘on’ by default), Pc•MACs will gather up all the audio and video files used by your shows, put them in the proper order for the player(s), configure the player(s) for you, and ‘draw’ in all the Audio/Video triggers in the shows to start them playing at the appropriate points in time(s) in your shows. The drag-n-drop folders that Pc•MACs creates can all be found in the ‘Download Files/SiteFileName/’ folder in the folder where your shows are stored.

### Contents of the drag-n-drop folder for most GilderGear:

GilderGear that doesn’t include Audio/Video playback will only need the AutoDownload file to run:

- 1) **AutoDownload file:** This file contains all of the shows you moved to the [AutoDownload List](#). (only for the [AutoDownload 'Target'](#))
- 2) **‘Set’ file:** A text file with information about the files that are contained in the AutoDownload file (only for the [AutoDownload 'Target'](#)). Moving this file is optional. The GilderGear doesn’t need this file to run, but it is small and usually moved along with the AutoDownload file to the Sd card.
- 3) **‘Old AutoDownloads’ folder:** Pc•MACs uses this folder to back up earlier AutoDownloads. Although it won’t do any harm (the old ‘.a00’ AutoDownload files are renamed as ‘.old’ by Pc•MACs), there is no reason to drag this folder or its contents to the Sd card for the [AutoDownload 'Target'](#). It can get really BIG after a few AutoDownloads.

### Contents of the drag-n-drop folder for each Sd-50/8 or Sd-50/40

If you are AutoDownloading to an **Sd-50/8** or **Sd-50/40**, the only question Pc•MACs will ask you is if you want to use the built-in amplifier or not. Pc•MACs only asks this on the first AutoDownload for an **Sd-50/8** or **Sd-50/40**. On subsequent AutoDownloads, Pc•MACs uses whatever setting you picked on the first AutoDownload. The contents of the drag-n-drop folder for each Sd-50/8 or Sd-50/40 is as follows:

- 1) **AutoDownload file:** This file contains all of the shows you moved to the [AutoDownload List](#). (only for the [AutoDownload 'Target'](#))
- 2) **‘Set’ file:** A text file with information about the files that are contained in the AutoDownload file (only for the [AutoDownload 'Target'](#)). Moving this file is optional. The GilderGear doesn’t need this file to run, but it is small and usually moved along with the AutoDownload file to the Sd card.
- 3) **‘Old AutoDownloads’ folder:** Pc•MACs uses this folder to back up earlier AutoDownloads. Although it won’t do any harm (the old ‘.a00’

AutoDownload files are renamed as '.old' by Pc•MACs), there is no reason to drag this folder or its contents to the Sd card for the [AutoDownload 'Target'](#). It can get really BIG after a few AutoDownloads.

- 4) **'SOUNDS' folder** for all the SoundFiles used in your shows.
- 5) **SD-50.CFG** configuration file for the Sd-50/8 or Sd-50/40.
- 6) **Sd-50 Config.exe** program incase you need to manually open the SD-50.CFG configuration file if needed. This won't normally be needed, since Pc•MACs has already configured the Sd-50 for you.
- 7) **Schedule.sch:** (Optional) 365 day schedule or playing shows and sounds (only for the [AutoDownload 'Target'](#) Sd-50/8 or Sd-50/40, and only if a schedule was entered)

#### **Contents of the drag-n-drop folder for Sd-25s w/DMX:**

For **Sd-25s w/DMX**, Pc•MACs creates a drag-n-drop folder for each **Sd-25** in your project. Inside this drag-n-drop folder are all the SoundFiles needed by the **Sd-25**, along with a text file telling you what the proper settings for the **Sd-25's** dipswitches are:

- 1) **SoundFiles:** Pc•MACs will copy the appropriate SoundFiles from your 'Media' folder for this project, and put them into the 'root' level of this Sd-25 drag-n-drop folder.
- 2) **'Set' file:** This is a text file that has a listing of all the SoundFiles in the folder, and the dipswitch settings needed by the Sd-25 w/DMX that are needed to configure and address it.

#### **Contents of the drag-n-drop folder for each BrightSign video player:**

For each BrightSign video player triggered thru GPIO using either the **v-Hd-to-DMX** or **v-Hd-to-1/4J6** and running the GilderScript, Pc•MACs will create a drag-n-drop folder. Within this folder, Pc•MACs will create the necessary 'playlist' folders and place the video files you have used into each of these. You will need to manually add the GilderScript to the folder. Optionally, you can also add a 'Background loop' folder to any video drag-n-drop folder. Any VideoFiles found in a 'Background loop' folder will be played whenever no triggered files are being played.

- 1) **Playlistxxx folders:** Each playlist folder contains all the VideoFiles you used in all of your shows on this player. Pc•MACs will copy the VideoFiles from your 'Media' for this project and put them into the appropriate 'Playlist' folders.

- 2) **'GilderScript' file:** This files has the name 'Autorun.brs'. The GilderScript is sold separately, so you will need to drag it to the Sd card or this drag-n-drop folder. If added to this drag-n-drop folder, it will remain in place through subsequent AutoDownloads.
- 3) **'Background Loop' folder:** If your application needs a background loop to play between the triggered videos, you will need to create a 'Background Loop' folder, and drop the videos you want to play into it. If added to this drag-n-drop folder, it will remain in place through subsequent AutoDownloads.

At the end of the AutoDownload process, Pc•MACs will have made a drag-n-drop folder for each [Target Device](#) and Audio/Video device that your project uses. Pc•MACs automatically opens the folder for the AutoDownload '[Target Device](#)', which contains the actual AutoDownload file and 'set' file<sup>13</sup>. Just drag-n-drop the content of each of these folders (NOT the entire folder!) onto blank flash cards, and insert them into your players.

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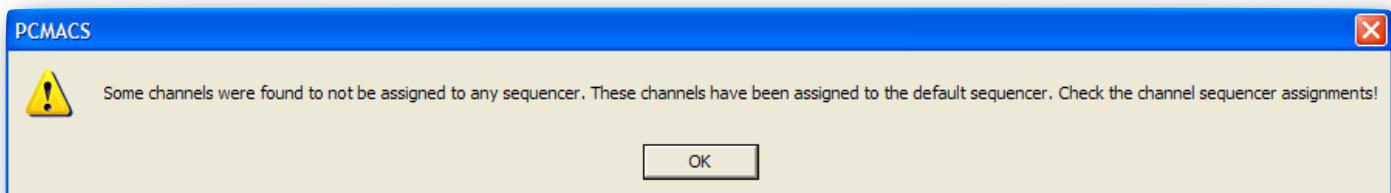
<sup>13</sup> The 'Set' file is a simple text file with the listing of the shows and settings which were used in the AutoDownload file.

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## Updating Older Shows

If you have older, existing shows that were created with older versions of Pc•MACs (versions prior to 2.0.216.1), it is a very simple process to update them. Using the new version of Pc•MACs, you can open any show that was created in any older version of Pc•MACs, or even older shows created in the original CP/M versions of ‘MACs’ 35 years ago<sup>14</sup>.

Upon opening an older show for the first time, Pc•MACs will tell you (twice) that it needs to add your channels to a sequencer. This is because the older versions of Pc•MACs didn’t support multiple sequencers, so there were no sequencer assignments made in prior versions of Pc•MACs.



The newer versions of Pc•MACs do support multiple sequencers, so all channels need to be assigned to a sequencer. Click OK to let Pc•MACs assign your older show’s output channels to the default ‘Sequencer 0’.

If you aren’t going to be converting your audio and video triggers to the new Drag-n-Drop Audio/Video triggers, that’s all you have to do to your existing shows to continue programming them using the latest versions of Pc•MACs. You are done and can skip the rest of this section.

Optionally, you can also update your shows to use Pc•MACs’ new drag-n-drop Audio/Video triggers. These support **Sd-25s w/DMX**, **Sd-50/8** or **Sd-50/40** or **BrightSign video players** triggered thru GPIO using either the **v-Hd-to-DMX** or **v-Hd-to-1/4J6** and running the **GilderScript**.

You just need to tell Pc•MACs which channels are used for the Audio or Video triggers so it can set them up for you.

### 1. Archive Your Existing Shows:

Before you start this conversion, archive your existing show’s folder on a (preferably) external and permanent media. This is just incase something goes horribly wrong during the upgrade, and you need to be able to go back to your original show files.

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<sup>14</sup> We haven’t actually tested this, because old CP/M shows are too hard to pull off 8” floppy disks

## 2. Open the ‘[Channels List](#)’ Dialog:

Typically all of your shows that run on the same ‘[Target Device](#)’ and site file will be located in the same folder. Open any one of your shows that already uses Audio or Video files. Then ‘Open>Show [Channels List](#)’ dialog is found under the ‘[Channels](#)’ menu. The shortcut is [F7].

## 3. View by ‘Devices’:

Use the radio buttons at the top of the dialog to select to view by ‘devices’.

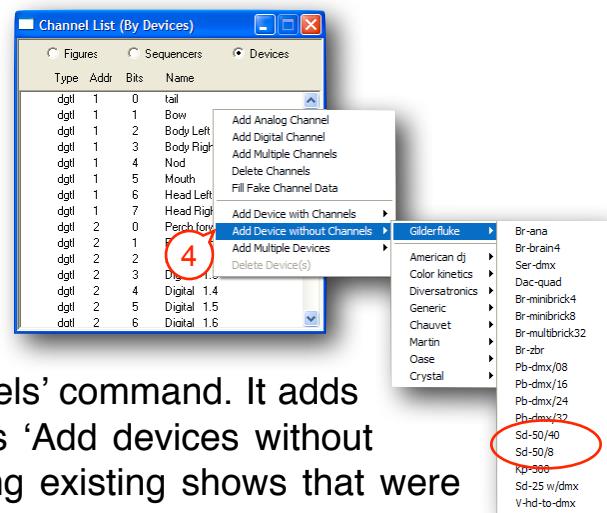
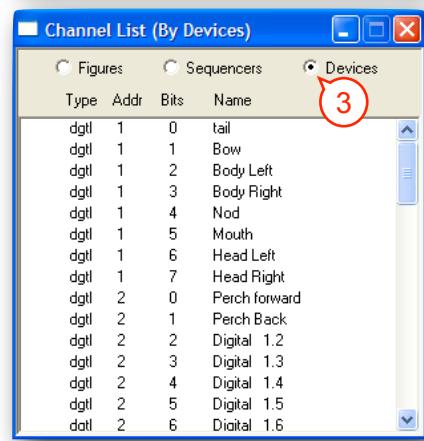
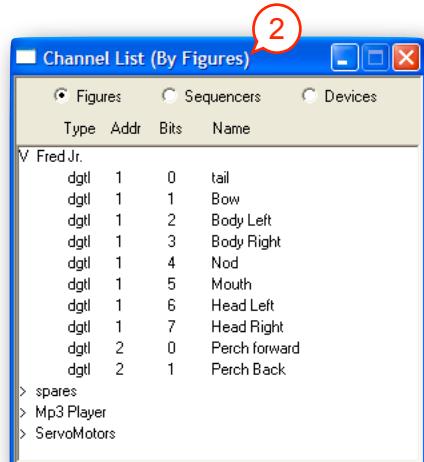
If this was a show and site created with the v.199 (or older) version of Pc•MACs, then all the analog and digital outputs used in your show will be listed here, but there will be no ‘device’ folders in the list.

If this show and site file were created with a slightly newer version of Pc•MACs, there may already be some ‘device’ folders in the list, and you may be able to skip the next step.

## 4. ‘Add Devices Without Channels’:

If your Audio/Video player(s) (Sd-25 w/DMX, Sd-50/8, Sd-50/40 or v-Hd-to-DMX) are already listed in the [Channels List](#) when showing ‘by Devices’, you can skip this step.

When creating a show, you would normally use the ‘Add Device With Channels’ command. Because you are upgrading an older show that already has all the channels it needs, you must to use this special ‘Add Devices Without Channels’ command. It adds the ‘Devices’, but not the output channels. This ‘Add devices without channels’ command is used solely for upgrading existing shows that were created using older versions of Pc•MACs.



Use the ‘Add Devices Without Channels’ command from the [‘Channels’ menu](#) or (RightClick) shortcut menu (as shown here) to add your Audio and Video devices (Sd-25s w/DMX, Sd-50/8 or Sd-50/40, v-Hd-to-DMX or v-Hd-to ¼J6).

## 5. Move AV Trigger Channels into the Appropriate ‘Devices’:

If your old show was already able to trigger Audio and Video files, then there are already some Audio/Video trigger channels somewhere in your [Channels List](#).

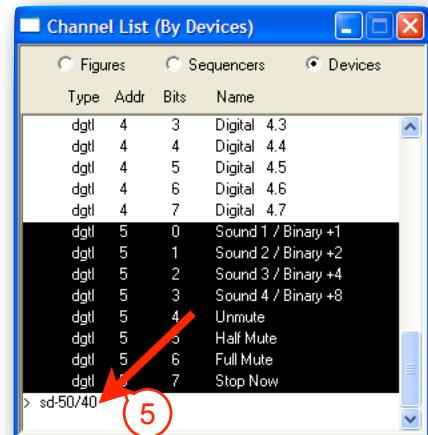
These channels won’t necessarily be named so that it is obvious that they are Audio/Video trigger channels. They will be named whatever the original show programmer decided to call them.

Typically, there will be eight digital trigger channels, all sharing the same DMX-512 address. In some cases there may be less than eight of them, but the key feature is that they are all on the same DMX-512 address.

For an Sd-50/8, the Audio/Video trigger channels will typically be on DMX-512 address 1 (zero-based DMX-512) or 2 ('one-based' (1 to 512) DMX-512).

For an Sd-50/40, the DMX-512 address for the Audio/Video trigger channels will typically be on DMX-512 address 5 (zero-based DMX-512) or 6 ('one-based' (1 to 512) DMX-512).

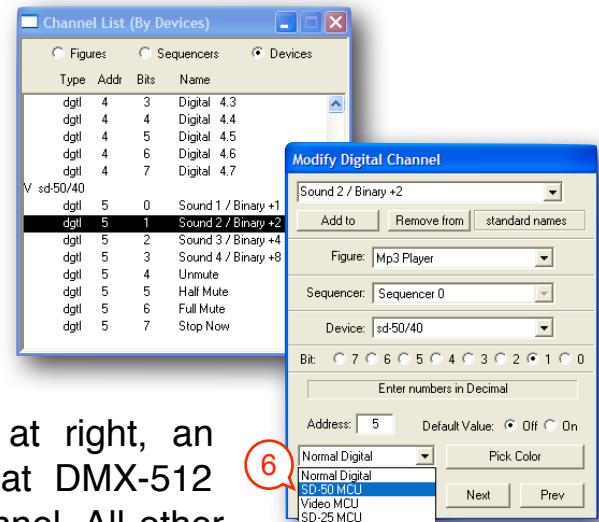
Select and drag all eight of the Audio/Video trigger channels into the appropriate Audio/Video device. Optionally, you can also drag all the other output channels that are part of your Sd-50/8 or Sd-50/40 as well, but only the actual Audio/Video trigger channels must be moved to the appropriate device. Repeat this for any Audio/Video devices you may have in your [Channels List](#).



## 6. Tell Pc•MACs that this is an ‘Audio/Video Trigger’:

Open each of the Audio/Video devices’ folders and double click on any one of the Audio/Video trigger channels.

In the lower left corner of the dialog, there is a new drop-down. These are probably going to be set to ‘normal digital’. You need to pop it open and switch it to a ‘MCU’ for the appropriate Audio/Video device. Doing this to just one bit will switch all eight bits that share the same DMX-512 address. In the sample at right, an Audio/Video trigger channel for an Sd-50/40 at DMX-512 address 5.1 is being set as a ‘Sd-50 MCU’ channel. All other outputs in DMX-512 address 5 will also be converted automatically.

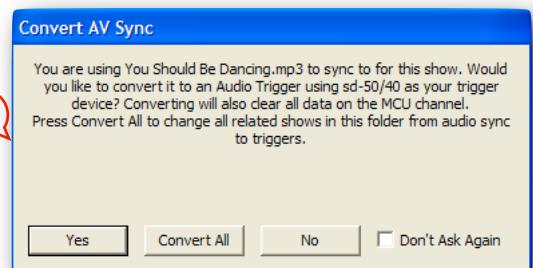


Do NOT repeat this for any other channels that use a different DMX-512 address. If you do, Pc•MACs won’t know which one to use for Audio/Video triggers, and may write the Audio/Video triggers into the wrong DMX-512 address, or overwrite other show data. (This is why you archived your data in step #1)

## 7. Save and ‘Convert Audio/Video Sync’:

Save your show and then reopen the same show. Opening the first show the ‘recent files’ list under the file pulldown is the quickest way to do this. Alternatively, you could open another show that uses the same site file. In either case, if Pc•MACs asks if you would like to save your current show before opening the next show, answer ‘Yes’.

As it opens the show, Pc•MACs will see your old Audio/Video Sync settings in the Show Info Dialog, and will ask if you would like them updated for this one show, or all the shows in the folder. You’ll probably want to answer ‘yes’ to ‘all the shows in the folder’, so that Pc•MACs will update all your shows at the same time.



If you click ‘No’, this will leave all of your hand-drawn audio triggers unchanged for this show. Each time you open any show that includes Audio/Video triggers and uses this site file, Pc•MACs will ask again if you want to convert your Audio/Video triggers.

Checking the ‘Don’t Ask Me Again’ and then ‘No’ will leave all of your existing hand-drawn triggers unchanged. Pc•MACs won’t ask you again about converting any Audio/Video triggers for shows that use this site file. If you later decide to go ahead with the conversion, you can uncheck the ‘Do not Convert Audio Sync to Triggers’ under the [‘Preferences’ menu](#).

When you open the shows that have been updated to the new drag-n-drop Audio/Video triggers, you will find that the Audio/Video ‘sync’ on the [‘Show Information....’ dialog](#) will have been changed to ‘internal’, and there are new Drag-n-drop triggers on the OffLine Editing Window. These drag-n-drop Audio/Video triggers will be at the same point in the OffLine Editing Window’s timeline as the ‘playback offset’ time that had been used for the Audio/Video files on the [‘Show Information....’ dialog](#).

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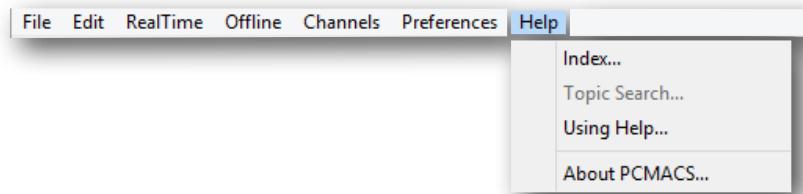
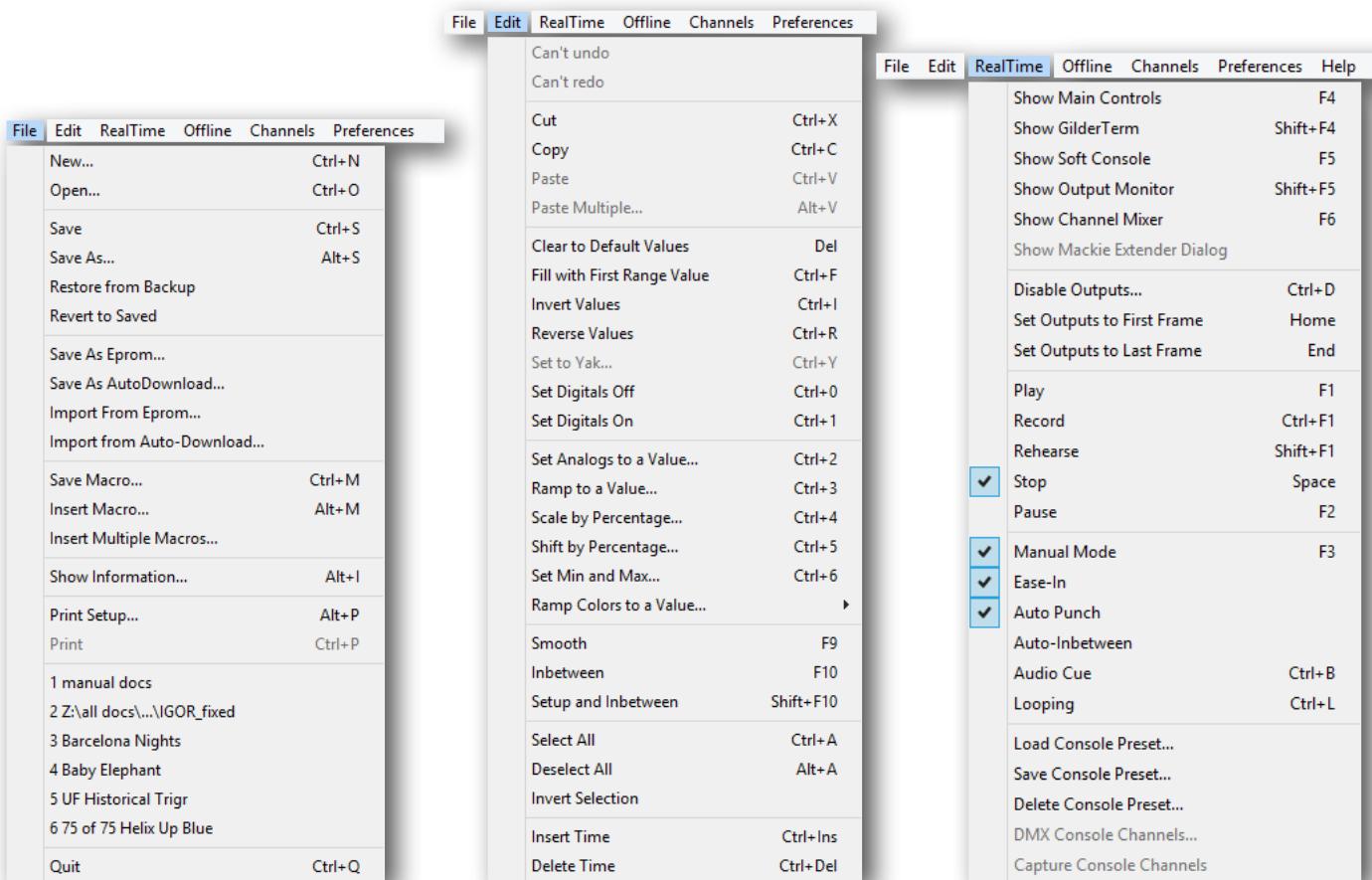
## Programming Hints

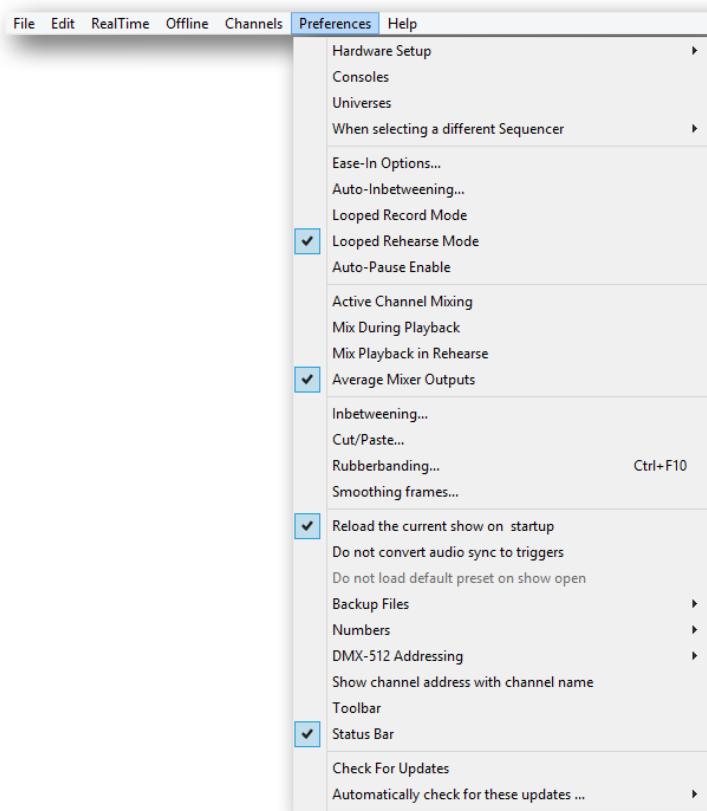
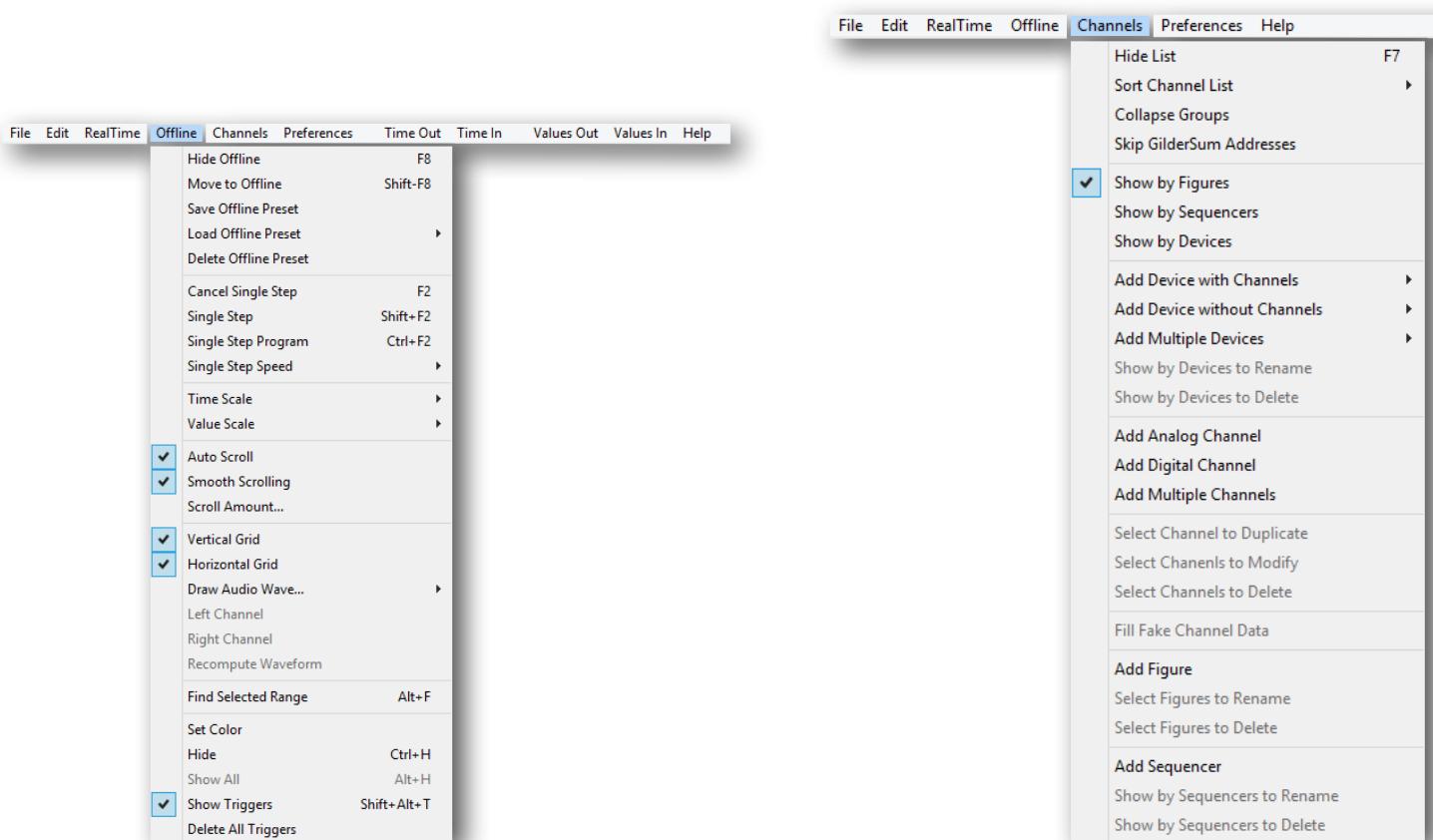
- 1) If you are going to be doing a lot of editing, you might want to make the show a little longer than is actually needed. This will allow channels to slide backwards in time without falling off the end of the show. You can trim the show to the final length after programming and editing has been completed.
- 2) An important thing to do when programming is to make sure that the ends of the shows have all the channels set to the same values. This is especially important where there will be several shows being played back on the final show playback system.
- 3) If you don't match up the ends, there is a potential for 'jumps' each time a new show is started. The easy way you make sure that there is never such a jump is to never set the 'Punch in' time all the way to the beginning of the show or the 'punch out' time all the way to the end of the show. The Auto-Inbetweening function will take care of perfectly matching up the ends.
- 4) Don't try to program too many channels at one time in real time. No one is that coordinated to control more than a few functions at one time.
- 5) Save lots of Console and OffLine Editing Window presets. There is no limitation to the number of presets you can save, so don't skimp out on these. You don't need to limit yourself to one preset for figure. Go ahead and make presets for any setup you find yourself using more than once.
- 6) Clear all of the inputs from the console you are using and save a 'clear console' preset. This makes it easy to get back to a cleared console whenever you need to. We have '<clear console>' as one of the standard console names list we send out with Pc•MACs.
- 7) There is a shortcut that helps you find glitches in a show. If during a play/record/Rehearsal you press the OffLine button on the main Pc•MACs window (or [F8]), it will stop the show at the current frame, open the OffLine Editing Window and put you into 'Single Step' mode at the frame where you stopped.
- 8) Use the little clock faces as shortcuts to get you around. As an example, to play just the selected area on the OffLine Editing Window: Pop up the to/from clock face and select 'copy to start & end'. Now when you start a 'Play', just the selected area will be played.
- 9) Always leave the 'Auto Inbetweening' 'On'. There is really no reason to ever turn it 'Off'. Typical settings are to 'Spline' over ten to twenty frames.

- 10) If at all possible, use a AudioFile/VideoFile show for all programming. It is the easiest and fastest way to program. Just the additional editing tools it gives you makes it worth sampling in the audio for the show, even if the show will normally be operated from DVD/LaserDisk or Smpte time code.
- 11) Use your RealTime programming as a ‘rough out’ for the ‘real’ programming. The final programming and cleanup is best done by programming little snippets in realtime and by editing on the OffLine Editing Window.

# Menus Overview

As with all PC programs, all commands are accessed through a pulldown menu bar located at the top of the screen. Depending on what window is displayed and what has been selected, different pulldown commands may be enabled or disabled. The arrangement of the pulldown menus is as follows:





## 'File' Menu

As with all Windows programs, the '[File](#)' menu's is where all activity having to do with disk and printer operations are done.

### New... (<Control>+N)

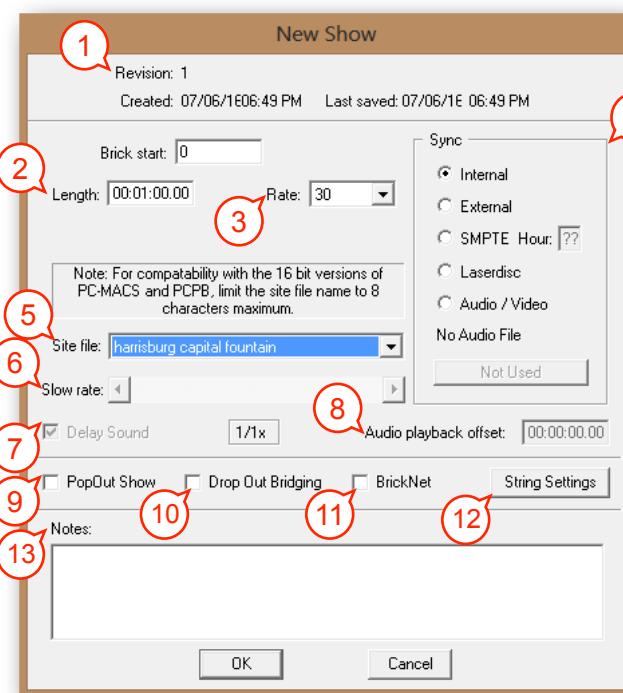
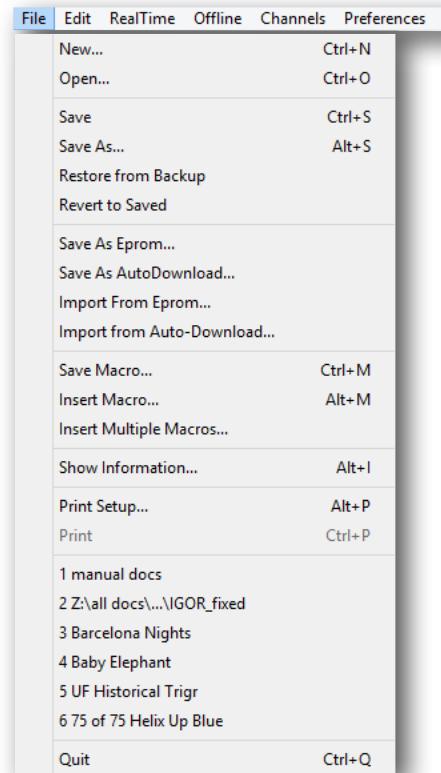
This command is used to start working on a new show or site. If there is already a show loaded that has been changed, Pc•MACs will ask if you would like it saved and then bring you into the '[Show Information....](#)' dialog below. When a new show is created, all movements are filled with their default values, as defined in the site file being used.

#### 1. Revisions:

The block at the top of the dialog shows the creation and 'last saved timestamps. The 'revision' is incremented on each 'save'.

#### 2. Show Length:

The length of the show is set here. This can be



changed at any time. If you changed the frame rate or show length, when you close the dialog, Pc•MACs will ask you if you want to stretch or compress any existing show data to fit the new length, lop off the existing data (if the show was shortened) or pad with default values (if the show was lengthened), or 'cancel' to leave the length unchanged.

#### 3. Frame rate:

Typically this is left at 30 FPS. It can be changed at any time. If you changed the frame rate or show length, when you close the dialog, Pc•MACs will ask you if you want to

stretch or compress any existing show data to fit the new frame rate, lop off the existing data (if the frame rate was increased) or pad with default values (if the frame rate was decreased), or ‘cancel’ to leave the frame rate unchanged.

#### **4. Sync:**

This sets the clock source for the frame rate used by this show. No matter the sync used on the final show, while programming a show it is normally using the ‘internal’ setting.

The ‘external’, ‘Smpte’ and ‘DVD/LaserDisc’ settings are currently only used to tell a Br-Brain4 that it will need to clock from one of these sources after the show is AutoDownloaded to it. In the future, Pc•MACs will support using a connected Br-Brain4 as a remote external, Smpte or DVD/LaserDisc timecode reader during programming.

The ‘Audio/Video’ sync is the legacy method of synchronizing Pc•MACs with an audio or video file. Although this legacy method can still be used, the current method of adding Drag-n-Drop Triggers to the OffLine Editing Window timeline is the recommended way of adding audio or video playback to a show.

Until Pc•MACs supports using a Br-Brain4 as a remote timecode reader, the recommended method of programming shows that use Smpte or DVD/LaserDisc timecode is to set the show’s timecode flags for ‘external’, ‘Smpte’ or ‘DVD/LaserDisc’ timecode, but then to add the audio or video file to the OffLine Editing Window timeline using the Drag-n-Drop Triggers. It can then be programmed like any other show. Once AutoDownloaded, the Br-Brain4 will see the timecode flags and use the appropriate timecode reader for the shows in the final installation.

#### **5. Site File:**

This is the most important setting on this dialog. The ‘Site’ file is where Pc•MACs stores information about everything Pc•MACs is controlling at a specific ‘site’. This includes types of inputs and outputs, the names you have given them, the console and other presets, what shows were included in any AutoDownloads and much more.

Depending on the type of shows you do, a ‘Site’ could be an attraction at a theme park, a display in a museum, a fountain, or a stand-alone ‘prop’ built by the dozens for the haunt market. No matter what type of shows you are building, each ‘Site’ should have its own uniquely-named ‘Site’ file. You should not use the default ‘PcMACs.ste’ ‘Site’ file for any ‘real’ shows. If you do, you have a good chance of screwing up your shows if you were to use it again on another project.

All the shows that run at a ‘Site’ should always use the same ‘Site’ file. This saves you from reentering the same stuff each time you start a new show. If you modify or add a preset, change the name of an output, or anything else, it will instantly and automatically be applied to all other shows which use the same ‘Site’ file.

To select an existing ‘Site’ file, there is a drop-down that lists every ‘Site’ file name that you have ever used on your computer, or if you scroll to the top of the list, you can enter a ‘New’ site file name or ‘Duplicate’ the current ‘Site’ file.

## 6. Slow Rate:

*Not all computers support this function.* This allows you to play and record your shows at a temporarily slowed frame rate. Set the slider back to ‘1/1x’ to play your show at the normal frame rate.

## 7. Delay Sound:

*This is part of the legacy Audio/Video sync, and shouldn't be used on new shows.* Leave this checked to delay the Audio/Video file start by the amount of time set in the Audio Playback Offset.

## 8. Audio Playback Offset:

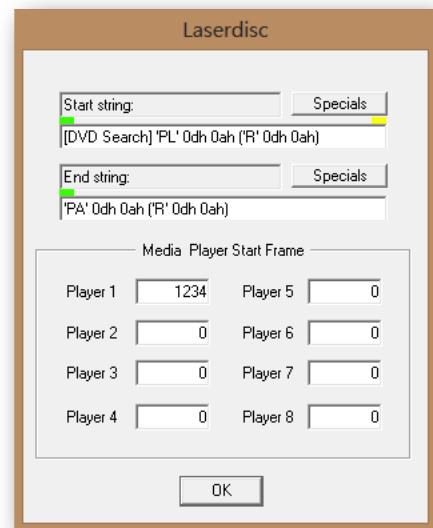
*This is part of the legacy Audio/Video sync, and shouldn't be used on new shows.* This sets the time that the Audio/Video file is delayed after the start of the show.

## 9. PopOut Show:

This tells the Br-Brain4 that the show which is playing is a PopOut Show. See the section of the manual on Multi-Sequencer and PopOut shows for details on this.

## 10. Drop Out Bridging:

If running from the Smpte or DVD/Laserdisc timecode, tells the timecode reader on the Br-Brain4 what to do if the timecode stops unexpectedly. If not checked, the show will freeze at the frame where the timecode stopped. If checked, the show will drop onto internal timecode and continue playing towards the end. In either case, if the timecode picks back up before the end of the show is reached, the show will resume following the timecode.



## **11.BrickNet:**

Tells the Br-Brain4 to listen for timecode coming from another Br-Brain4 through the BrickNet, rather than listening to the timecode indicated by the timecode flags. This is used to stack Br-Brain4s for shows that go beyond four DMX-512 universes.

## **12.String Settings:**

By default, the LaserDisc strings are named ‘Start String’ for the string that is sent at the beginning of a show and ‘End String’ for the string that is sent at the end of the show. If desired, a unique name for each string can be entered.

The ‘Specials’ button allows you to enter several commonly needed string values, as well as several ‘special’ markers for your strings:

- a) Restore: This clears out everything from the string entry field.
- b) String: You can enter an ascii string here. When you click ‘OK’, single quote marks are added and the text is moved to the string entry field.
- c) Numeric Values: This gives examples of decimal, hex and octal numeric values. You can enter a decimal value here. A green light indicates that your number is formatted properly.
- d) Make Pretty: This attempts to clean up a string that is not properly formatted.
- e) Return: Inserts a <Carriage Return> character = 0x0d.
- f) Line Feed: Inserts a <Line Feed> character = 0x0A.
- g) Return/LineFeed: Inserts both a <Carriage Return> and <Line Feed> = 0x0D 0x0A.
- h) Get Anything: This is used when you need to get a character back from the serial port, but don’t care what the value of that character is.
- i) Talk All & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through all eight ports, and listen to only the first port. The Br-SDC8 stays in this mode until another MUX command is received.
- j) Talk & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 1. The Br-SDC8 stays in this mode until another MUX command is received.

- k) Talk & Listen 2: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 2. The Br-SDC8 stays in this mode until another MUX command is received.
- l) Talk & Listen 3: This is MUX command used with the Br-SDC8 to send the following serial data out through port 3, and listen to only returned data through port 3. The Br-SDC8 stays in this mode until another MUX command is received.
- m) Talk & Listen 4: This is MUX command used with the Br-SDC8 to send the following serial data out through port 4, and listen to only returned data through port 4. The Br-SDC8 stays in this mode until another MUX command is received.
- n) Talk & Listen 5: This is MUX command used with the Br-SDC8 to send the following serial data out through port 5, and listen to only returned data through port 5. The Br-SDC8 stays in this mode until another MUX command is received.
- o) Talk & Listen 6: This is MUX command used with the Br-SDC8 to send the following serial data out through port 6, and listen to only returned data through port 6. The Br-SDC8 stays in this mode until another MUX command is received.
- p) Talk & Listen 7: This is MUX command used with the Br-SDC8 to send the following serial data out through port 7, and listen to only returned data through port 7. The Br-SDC8 stays in this mode until another MUX command is received.
- q) Talk & Listen 8: This is MUX command used with the Br-SDC8 to send the following serial data out through port 8, and listen to only returned data through port 8. The Br-SDC8 stays in this mode until another MUX command is received.

There are two fields where you enter your string. Entries can be separated by spaces, a comma, or a comma and spaces. If the string is entered correctly, a green light will appear above this field. Numeric values can be entered any of several different formats:

Ascii strings should be enclosed within single or double quotes.

Decimal values can be between any number of digits, as long as the value is between zero and 255.

Hexadecimal numbers can be entered as dh, 0dh, 0xd or 0x0d.

For old timers, octal values are entered as four digits with the leading digit a zero, the second digit 0-3, and the remaining two digits 0-7.

You can enter the starting frame number for a maximum of eight DVD/LaserDisc players. If there are multiple players, they are connected to the Br-Brain4 via a Br-SDC08, which multiplexes the communications to each of the player automatically. A zero value tells the Br-Brain4 to skip that player.

## **Open... (<Control>+O)**

This command is used to open a show that has been previously been saved. It uses the standard Windows file open dialog to allow you to choose disks, directories and files. If there is already a show opened and it has been changed, Pc•MACs will ask you if you would like to save it before loading another.

## **Save (<Control>+S)**

This is the standard Windows Save command. If the Backup Files option is 'On', the last saved version will be given a '.BAK01' extension before the show is saved to disk. This gives you the added safety of always having between zero and 99 most recent versions of your show available to you. The number of revisions to archive is set under the ['Preferences' menu's](#) Backup Files option.

As with all computer programs, you should save 'early and often'. Writing a file to a disk from Pc•MACs is fairly fast. As a general rule of thumb when operating any computer program, you should Save often enough that you won't get really pissed if the computer shuts down and you loose something.

## **Save As... (<Alternate/Option>+S)**

This is the standard command that is used in Windows programs when you want to save the current show under a different name or to a different location. It uses the standard Windows dialogs.

## **Restore from Backup...**

This command is used if you have really screwed up your show, but only if you have previously enabled the automatic backup functions. The ['Preferences' menu's](#) Backup Files option can be set to save between zero and 99 of the most recent versions of your shows.

This command will allow you to switch back to one of these earlier versions of the show and site files.

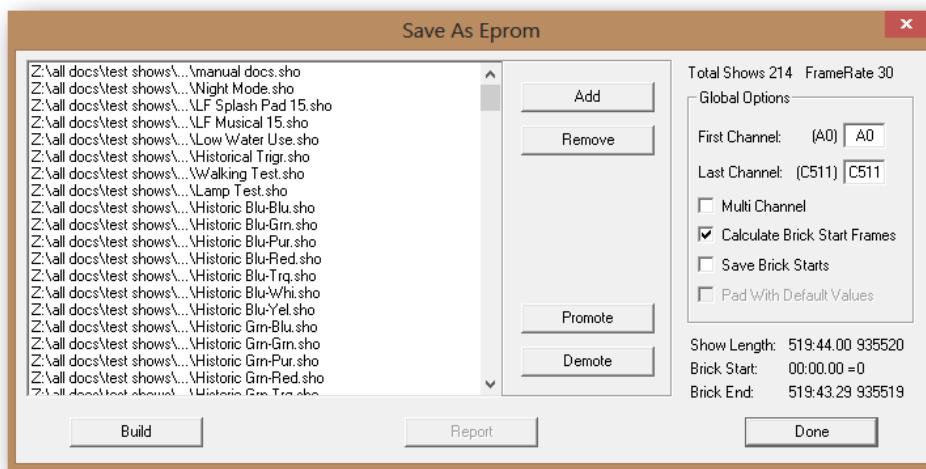
Each time your Save your show, Pc•MACs can archive the last saved version of your show into the Backups folder for your current site. The last saved show is renamed as .BAK01, while the previous .BAK01 becomes .BAK02, and so on up to a maximum of .BAK99. After the backup folder has been filled with the number of backups you have set Pc•MACs to save, the oldest show is erased to make room for the latest show.

## Revert to Saved

This command is used if you have really screwed up your show, but haven't saved your show since before you screwed it up. It will switch you back to the last saved version of your show.

## Save As Eprom...

*This command requires a MACs-License to use. This is a legacy feature, which is not normally used in new projects.*



This command was used to save files to be burnt into Eproms, back in the day when Eproms were the only way to store your finished shows on the permanent control system. This command has long since been superseded by the [Save as AutoDownload Command](#).

This command is only here to support the odd 35 year old GilderGear control system that needs its shows updated, and as a way to export raw data files from Pc•MACs.

If the currently open show has been changed in any way since the last Save, Pc•MACs will ask if you would like to save it before the Eprom files are saved.

## Add/Remove

These command are used to add and remove shows you have programmed from the 'Save As Eprom' list that takes up most of this window. Up to two hundred fifty-five shows can be loaded into any Eprom file. Any show which is added to this list will be included in the Eprom files you are creating when you press the Build command. The Add command opens a standard Windows file open dialog. Multiple shows can be selected by pressing the <shift> or <Control> keys when making selections. The Remove command will take any selected show(s) off the Save As Eprom list.

## Promote/Demote

These buttons are used to move the selected show(s) up or down within the 'Save As Eprom' list.

## First Channel/Last Channel

These entries are used to select that channels of your show will be saved to the Eprom files(s) when you press the 'Build' button. The first time you open this dialog, these values will default to '0' to whatever the last address of the last output you have created. These numbers will be displayed and entered in decimal or HEXadecimal numbers, depending on the numbering system selected under the ['Preferences'](#) menu.

## Multi-Channel

The Eprom files used in Gilderfluke & Company's BS-CRDs and BS-CRDs use Eprom files that each contain one eight bit channel. Check on the 'Multi Channel' checkbox if saving Eprom(s) for a BS-ANA, BS-DMX-Tx, BS-Serial, RTU/FSK, BS-EFB, or any other device that needs Multi Channel Eproms. When saving Multi Channel Eprom files, the first four bytes also contain the frame rate, number of channels and the length of the first show in the Eprom.

## Calculate Brick Start Frames

You will always want to use this checkbox to allow Pc•MACs to automatically calculate the offset into the Eproms needed for the shows you are saving. If you would like to preserve the 'Start frame' values in the show files, also check the 'Save Brick Starts' checkbox. If you are not using the Calculate Brick Start Frames checkbox, you will have to set these individually for each show under each shows' ['File'](#) Menu/ ['Show Information....'](#) dialog. If they are set improperly, Pc•MACs will tell you if any of the shows are overlapping during the build.

## Save Brick Starts

If you are using the Calculate Brick Start Frames feature, this checkbox will cause the Brick Start values that Pc•MACs calculates to be written back into each show file's '[Show Information....](#)' dialog. This feature is not normally needed.

## Pad with Default Values

When using 'Brick Starts' that you have entered, Pc•MACs can pad the space between the shows with the default values for the movements if you have checked this checkbox. Since the Calculate Brick Start Frames feature is almost always used, this feature rarely comes into use.

## Report

If you press this button, Pc•MACs will display the information about the Eprom set you just saved.

This information is also saved in a text file with the same name as the Eproms, but with the extension of '.set'. You can open this file with any text editor like Notepad or Wordpad.

## Build

This button brings up a standard Windows 'Save As...' dialog. By default, the name of the file will be the name of the first show in the 'Save As Eprom' list. You can change it to anything you would like. The extension that will be added to the filename is:

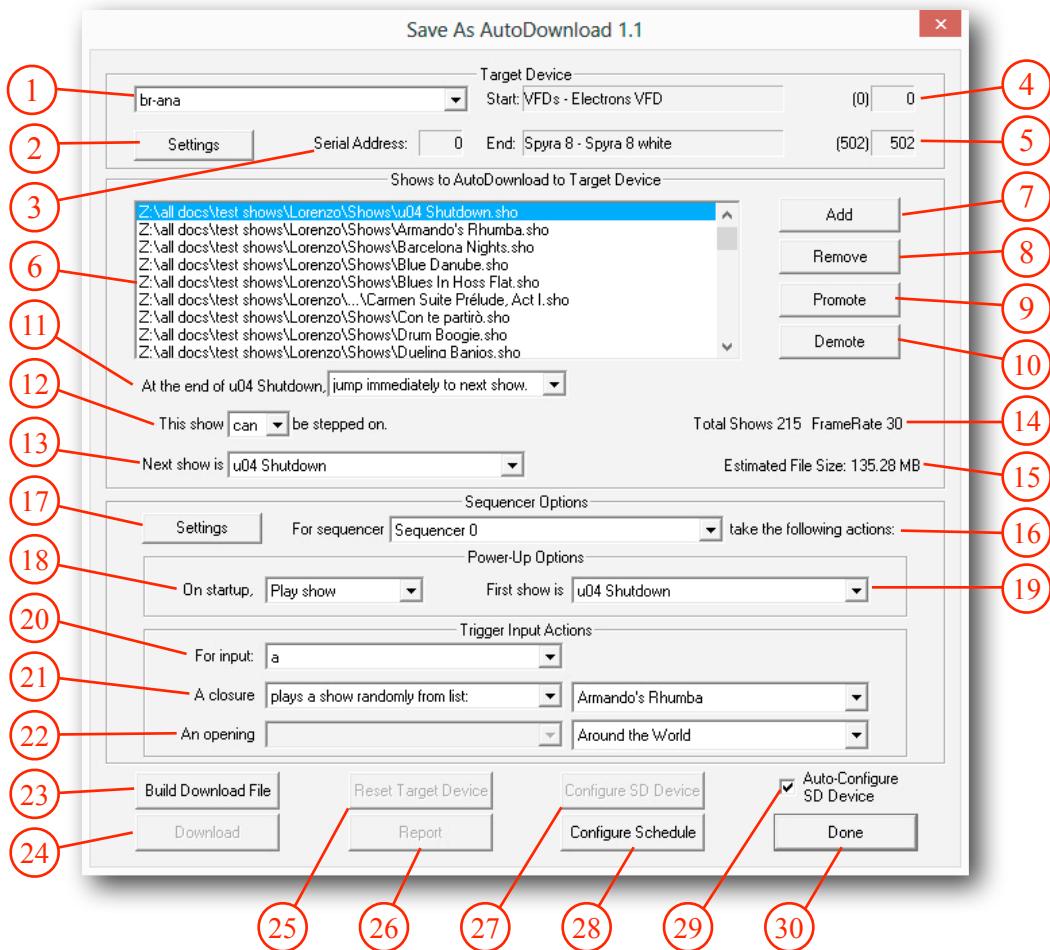
Single Channel Eprom files: 'rnn', where 'nn' is the address in HEXadecimal of that channel.

Multiple Channel Eprom files: 'mnn', where 'nn' is the address in HEXadecimal of the first channel stored in the Eprom file.

The number of shows in the 'Save As Eprom' list is displayed on the 'Save As Eprom' window, as well as the frame rate of the selected shows. All shows within a single Eprom set must use the same frame rate. If you select one or more shows from the 'Save As Eprom' list, the information about the show(s) will be displayed.

## Save As AutoDownload...

The final step in programming most shows is to generate an AutoDownload file to run on the permanent Show Control System. In this example, Pc•MACs has picked a Br-ANA as the '[Target Device](#)'. Pc•MACs automates most of the AutoDownload process for you.



The [AutoDownload dialog](#) has four sections:

- '[Target Device](#)' (numbers 1-5)
- 'Shows to Download to Target Device' (numbers 6-15)
- 'Sequencer Options' (numbers 16-22)
- 'Trigger Input Actions' (numbers 20-22)

You start at the top of the dialog, and work your way to its bottom to complete your AutoDownload:

## 1) Pick the ‘Target Device’ for this AutoDownload:

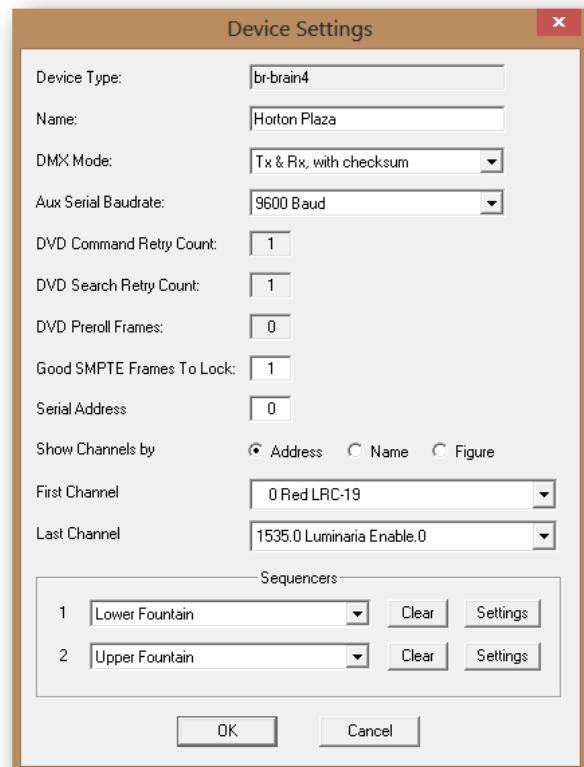
The ‘[Target Device](#)’ is what you have chosen to be the DMX-512 ‘Master’ for your permanent control system, once your PC is removed from the system. Pc•MACs automatically picks the most likely ‘[Target Device](#)’ for your AutoDownload. If you want to build the AutoDownload file for another device in your [Channels List](#), just pick it from this drop-down.

## 2) Device Settings:

This opens the settings dialog for the ‘target’ device. In this example, a Br-Brain4 is the [Target Device](#). Most other GilderGear have far fewer options.

You can set:

- The name of the device, which will appear on The Br-Brain4’s LCD and various menus.
- The settings for the ‘target’ device’s DMX-512 port.
- The baud rate of the Br-Brain4’s secondary serial port.
- The DVD/LaserDisc timecode Command Retry Count (Br-Brain4).
- The DVD/LaserDisc timecode Search Retry Count (Br-Brain4).
- The DVD/LaserDisc timecode Preroll Frames (Br-Brain4).
- The number of good, consecutive Smpte timecode frames which must be received by a Br-Brain4 before it will believe the timecode is valid.
- Serial port address (0-255).



Unless you tell it otherwise, Pc•MACs will automatically download all the channels in your [Channels List](#), or at least as many as the [Target Device](#) can hold.

You can pick a different range of channels using either the name of the channel or DMX-512 address for the channel. If you have purposely selected and consummated an AutoDownload to a [Target Device](#) with a smaller range of channels, Pc•MACs will remember this on subsequent AutoDownloads to that [Target Device](#).

For Multi-Sequencer projects, you can select which sequencer runs on which sequencer. For projects with [PopOut](#) shows, you must have the ‘Main’/‘First’ show running on the first sequencer in the list.

**3) Serial Address:**

If AutoDownloading your shows to the [Target Device](#) through the serial port, this is the serial address which will be used.

**4) ‘Start’ Channel for the Range of Channels in this AutoDownload:**

**5) ‘End’ Channel for the Range of Channels in this AutoDownload:**

Unless you tell it otherwise, Pc•MACs will automatically download all the channels in your [Channels List](#), or at least as many as the [Target Device](#) can hold. The value in the boxes should be equal to the values shown just to their left (in parenthesis). These are the first and last DMX-512 addresses used in your [Channels List](#).

You can pick a different range of channels using either the name of the channel or DMX-512 address for the channel. If you have purposely selected and consummated an AutoDownload to a [Target Device](#) with a smaller range of channels, Pc•MACs will remember this on subsequent AutoDownloads to that [Target Device](#).

**6) List of ‘Shows to AutoDownload to [Target Device](#)’:**

This is the list of which shows will go into this AutoDownload file. You can reorder them as needed, and pick one or more show files at a time to set:

- a) What happens at the end of the show
- b) Whether it can be stepped upon (or not) by another show request coming in while it is still running
- c) What the ‘next’ show is

You can use the standard Windows `<shift>RightClick` to select a contiguous range of shows, or the `<control>+RightClick` to select random entries in the list.

You can add the same show file to the [AutoDownload List](#) multiple times. Each additional instance of the show only occupies a few additional bytes in the AutoDownload file.

A typical use of this feature is in an installation where you play alternating ‘Foreground’ and ‘Background’ (BGM) shows. The ‘Background’ shows act as a ‘delay’ and ‘Keep Alive’ show between the ‘Foreground’ shows. Your [AutoDownload List](#) would look like this:

- 1) ‘Foreground’ show #1: Unsteppable, Jump at end to BGM instance #1

- 2) BGM show instance #1: Steppable, Jump at end to ‘Foreground’ show #2
- 3) ‘Foreground’ show #2: Unsteppable, Jump at end to BGM instance #2
- 4) BGM show instance #2: Steppable, Jump at end to ‘Foreground’ show #2
- 5) ‘Foreground’ show #3: Unsteppable, Jump at end to BGM instance #3
- 6) BGM show instance #3: Steppable, Jump at end to ‘Foreground’ show #1

In this example, the shows will loop through all three ‘Foreground’ shows, with the ‘Background’ show to act as a delay and ‘keep alive’ show between each. At the end of the last ‘Background’ show, it jumps back up to the first ‘Foreground’ show. Once started, this will loop through all the shows until you pull the plug (or give it a ‘Stop’ or ‘Stop at End’ command). If you set any of these shows to be the Startup Show, and the Startup Action to ‘play’ that show, they will begin playing as soon as the Target Device is powered up. A trigger input set to ‘play whatever is next’ can be used to start the shows playing if they aren’t set to start on powerup. The input can also be used to break out any of the ‘Background’ shows and start the next ‘Foreground’ show immediately. This input will be ignored once the ‘Foreground’ shows are playing, as they have been set as unsteppable.

## 7) Add:

This uses a standard Windows file open dialog to select shows to add to the list of Shows to AutoDownload to Target Device. You can use the standard Windows `<shift>RightClick` to select a contiguous range of show files, or the `<control>+RightClick` to select random show files from the disk.

## 8) Remove:

This removes the selected shows from the list of Shows to AutoDownload to Target Device.

## 9) Promote:

Moves the selected shows in the list of Shows to AutoDownload to Target Device upward in the list.

## 10) Demote:

Moves the selected shows in the list of Shows to AutoDownload to Target Device downwards in the list.

## 11) What Happens ‘At the end of show....’

If started with a simple ‘Play’ command, nothing will happen at the end of the show. The show will stop, and the controller will sit there waiting for the next command before it does anything else.

If the show is started using a ‘Loop’ or ‘Start’, then you can set what will happen at the end of the selected shows. The choices are ‘do nothing’ or ‘Jump immediately to next show’.

If you want the show to play to its end, then stop and wait for the next command to come in, set this show to ‘do nothing at the end’.

If you want the show to loop on itself, or to jump to another show at its end, you set the show to ‘Jump immediately to next show’.

## 12) ‘The show Can/Can’t be stepped on’

You can set whether the selected shows ‘can’ or ‘can’t’ be stepped on once started.

If a show can be stepped on, if another request to start a show arrives while it is running, it will be honored.

If a show ‘can’t’ be stepped on, the start command will not be honored while the unsteppable show is running.

## 13) The ‘Next Show Is...’

You can select from any specific show within the [AutoDownload List](#), or just set it for the ‘next show in list’.

If you want the show to loop on itself at its end, you set the ‘Next Show’ to the same Show.

If you want the show to jump to another show at its end, you set the ‘Next Show’ to whatever show you want to jump to.

Another typical installation has a single ‘Background’ (BGM) show and several ‘Foreground’ shows. On power-up and between the ‘Foreground’ shows, the ‘Background’ show is looped. The ‘Foreground’ shows are only played when they are triggered. Your [AutoDownload List](#) would look like this:

- 1) Background show: Steppable, Jump at end to the ‘Background’ show
- 2) Foreground show #1: Unsteppable, Jump at end to ‘Background’ show #1
- 3) Foreground show #2: Unsteppable, Jump at end to ‘Background’ show #1
- 4) Foreground show #3: Unsteppable, Jump at end to ‘Background’ show #1
- 5) Foreground show #4: Unsteppable, Jump at end to ‘Background’ show #1
- 6) Foreground show #5: Unsteppable, Jump at end to ‘Background’ show #1

In this example, set the ‘Background’ Show to be the [Startup Show](#), and the [Startup Action](#) to ‘play’ that show. It will begin looping the ‘Background’ Show as soon as the [Target Device](#) is powered up. [Trigger inputs](#) are set to ‘start’ the different Foreground Shows. At the end of any ‘Foreground’ Show, they jump back

to the looping the ‘Background’ show and wait for the next trigger input to arrive. These inputs will be ignored once the ‘Foreground’ shows are playing, as they have been set as ‘[unsteppable](#)’.

#### 14) Number of Shows in the [AutoDownload List](#), and the frame rate:

This displays the number of shows that have been moved into the [AutoDownload List](#), and the frame rate of the selected show(s) is displayed.

#### 15) Estimated size for the AutoDownload file:

Pc•MACs estimates the size of the AutoDownload file that will be generated.

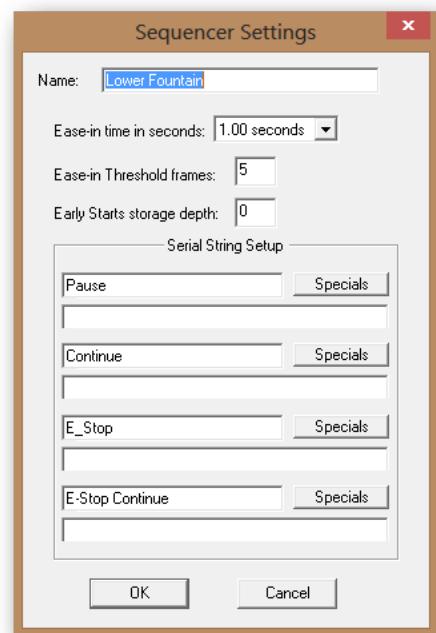
#### 16) Select Sequencer:

Most projects use only a single sequencer. For multiple-Sequencer applications, the remainder of the AutoDownload settings are all set for each sequencer. This drop-down is used to select which sequencer you are configuring.

#### 17) Settings for the Selected Sequencer:

This opens the settings for the selected sequencer.  
You can set:

- a) The name of the sequencer, which will appear on The Br-Brain4’s LCD and various menus
- b) The EaseIn time for analog Channels
- c) The threshold for how big of a jump in frames will trigger an EaseIn
- d) How many requests the Br-Brain4 will bank if it receives start commands while running an unsteppable show.
- e) The serial strings that a Br-Brain4 will send out when a show is paused, continued, E-Stopped or E\_Cleared



#### 18) Set what the [Target Device](#) does on StartUp for the Selected Sequencer:

Use this section to set which show gets loaded and what happens when power is applied to the [Target Device](#). It can play the show, or just load the first frame of data from your startup show and wait for the first trigger to arrive. Most shows use only a single sequencer. On Multi-Sequencer Shows, you can set this for each sequencer.

## **19) What Show is Loaded on StartUp for Selected Sequencer:**

By default, Pc•MACs will set the first show in the [AutoDownload List](#) as the first show to load after the [Target Device](#) powers up. You can use this drop-down to select any other show in the [AutoDownload List](#) as the ‘startup’ show.

## **20) Set what the [Target Device](#) does on each Trigger Input:**

Each [Target Device](#) has different numbers of trigger inputs, and different things it can do with them. You can pick one input at a time, and set what will happen on both the opening and closing edges of the input you have chosen. Most shows use only a single sequencer. On Multi-Sequencer Shows, you can set this for each sequencer.

## **21) What happens on an input closure:**

This is used to set what happens on the closing edge of an input. A closing edge is when current begins flowing thru the optoisolator that is used on each input.

Each piece of GilderGear has its own list of what it can do on its inputs. All of them will do the basics (starting, stopping, pausing, continuing, etc.). Others will have additional commands to scale the analog outputs’ voltage, supporting binary inputs, E-Stopping, E-Clearing, and for playing shows randomly or sequentially ‘from a list’. If used, the three ‘from a list’ commands disable the opening edge commands, and allow you to select a contiguous range of shows to play randomly or sequentially.

Many of these commands need a show or other variable specified. This is done using the drop-down just to the right of the drop-down where you select the command.

## **22) What happens on an input opening:**

This is used to set what happens on the opening edge of an input. An opening edge is when current stops flowing thru the optoisolator that is used on each input.

Each piece of GilderGear has its own list of what it can do on its inputs. All of them will do the basics (starting, stopping, pausing, continuing, etc.). Others will have additional commands to scale the analog outputs’ voltage, supporting binary inputs, E-Stopping, E-Clearing, and for playing shows randomly or sequentially ‘from a list’. If used, the three ‘from a list’ commands disable the opening edge commands.

Many of these commands need a show or other variable specified. This is done using the drop-down just to the right of the drop-down where you select the command.

### **23) Build your AutoDownload file:**

Once you have completed all the settings, you can use the ‘Build Download File’ button to simply build the AutoDownload file. You can rename the AutoDownload, or use the default name and location (changing locations is not recommended). Your previous files will be renamed as ‘.old’ and moved to the ‘old AutoDownloads’ folder.

The AutoDownload files by default will be stored in a folder Pc•MACs creates named ‘Download Files’ in the folder that holds your show(s). Inside of this will be a folder with the same name as the site file used for your shows. Inside this are the individual drag-n-drop folders for each ‘Target’ and/or Audio/Video device used in your shows. At the end of the AutoDownload, Pc•MACs automatically opens the [AutoDownload Target’s](#) folder for you. This makes it easy to drag the AutoDownload and set files to your flash card.

### **24) Download your AutoDownload file:**

This command first saves your AutoDownload file to disk exactly like the previous command. It then sends the file to the ‘target’ device through the serial port connection. This command will be unavailable if no serial port is selected for Pc•MACs to use, or the ‘target’ device is not found on through an ethernet connection.

If you have selected the realtime update of your AutoDownload Bricks through the serial port and have turned on 'Manual' mode, then it will temporarily be turned off during a Reset or Download. At the end of the download, it won't be turned back on until you dismiss the ‘successful download’ dialog. During this time you can test the AutoDownload Brick to make sure the Brick is doing everything that it should.

### **25) Reset [Target Device](#):**

This sends a command through the serial port to the addressed [Target Device](#) which tells it to erase its internal memory and configuration settings. Among other things, this confirms that communications have been established between Pc•MACs and the [Target Device](#).

### **26) Report:**

As part of the AutoDownload, a text file is left in the AutoDownload folder for the [Target Device](#). It lists the shows, number of channels, etc. that are in the AutoDownload. This button opens this file for display in Pc•MACs.

## **27) Configure Sd Device:**

After an AutoDownload has been completed for a Sd-50 as the [Target Device](#), this allows the user to open the configuration file for the Sd-50 using the Sd-50 Config.exe program. Other than for the purposes of creating and/or editing the schedule file, there is very little reason for opening this. Pc•MACs has already configured the Sd-50 as needed.

Please refer to the Sd-50 manual for details on the Sd-50 Config.exe program.

## **28) Configure Schedule:**

This opens just the Schedule.sch file for editing the 365 day schedule for a Sd-50/8, Sd-50/40 or Br-Brain4 using the Sd-50 Config.exe program.

Please refer to the Sd-50 manual for details on the Sd-50 Config.exe program.

## **29) Auto Configure Sd Device:**

This checkbox is normally left ON. It tells Pc•MACs to configure Sd-25(s) w/DMX, Sd-50s and BrightSign video players, draw in all the Audio/Video triggers in the shows, and organize the files for you to drag-n-drop onto the Sd flash cards for these devices.

## **30) Close the AutoDownload dialog:**

Once you have completed the AutoDownload, you can close the [AutoDownload dialog](#). All the settings will be saved for this [Target Device](#) as part of the site file for your shows. If you need to build the AutoDownload file again in a few minutes, or in a few decades, the settings will come back just as you left them when you reopen this dialog.

If you have used the drag-n-drop Audio/Video triggers in your shows, and have the ‘Auto Configure SD Device’ checked (it’s ‘on’ by default), Pc•MACs will gather up all the audio and video files used by your shows, put them in the proper order for the player(s), configure the player(s) for you, and ‘draw’ in all the Audio/Video triggers in the shows to start them playing at the appropriate points in time in your shows. The drag-n-drop folders that Pc•MACs creates can all be found in the ‘Download Files/SiteFileName/’ folder within the folder where your shows are stored.

If you are AutoDownloading to an Sd-50/8 or Sd-50/40, the only question Pc•MACs will ask you is if you want to use the built-in amplifier or not. Pc•MACs only asks this on the first AutoDownload for an Sd-50/8 or Sd-50/40, and uses whatever you picked for all subsequent AutoDownloads.

## Contents of the drag-n-drop folder for most GilderGear:

GilderGear that doesn't include Audio/Video playback will only need the AutoDownload file to run:

- 6) **AutoDownload file:** This file contains all of the shows you moved to the [AutoDownload List](#). (only for the [AutoDownload 'Target'](#))
- 7) **'Set' file:** A text file with information about the files that are contained in the AutoDownload file (only for the [AutoDownload 'Target'](#)). Moving this file is optional. The GilderGear doesn't need this file to run, but it is small and usually moved along with the AutoDownload file to the Sd card.
- 8) **'Old AutoDownloads' folder:** Pc•MACs uses this folder to back up earlier AutoDownloads. Although it won't do any harm (the old '.a00' AutoDownload files are renamed as '.old' by Pc•MACs), there is no reason to drag this folder or its contents to the Sd card for the [AutoDownload 'Target'](#). It can get really BIG after a few AutoDownloads.

## Contents of the drag-n-drop folder for each Sd-50/8 or Sd-50/40

If you are AutoDownloading to an **Sd-50/8** or **Sd-50/40**, the only question Pc•MACs will ask you is if you want to use the built-in amplifier or not. Pc•MACs only asks this on the first AutoDownload for an **Sd-50/8** or **Sd-50/40**. On subsequent AutoDownloads, Pc•MACs uses whatever setting you picked on the first AutoDownload. The contents of the drag-n-drop folder for each Sd-50/8 or Sd-50/40 is as follows:

- 1) **AutoDownload file:** This file contains all of the shows you moved to the [AutoDownload List](#). (only for the [AutoDownload 'Target'](#))
- 2) **'Set' file:** A text file with information about the files that are contained in the AutoDownload file (only for the [AutoDownload 'Target'](#)). Moving this file is optional. The GilderGear doesn't need this file to run, but it is small and usually moved along with the AutoDownload file to the Sd card.
- 3) **'Old AutoDownloads' folder:** Pc•MACs uses this folder to back up earlier AutoDownloads. Although it won't do any harm (the old '.a00' AutoDownload files are renamed as '.old' by Pc•MACs), there is no reason to drag this folder or its contents to the Sd card for the [AutoDownload 'Target'](#). It can get really BIG after a few AutoDownloads.
- 4) **'SOUNDS' folder** for all the SoundFiles used in your shows.
- 5) **SD-50.CFG** configuration file for the Sd-50/8 or Sd-50/40.

- 6) **Sd-50 Config.exe** program incase you need to manually open the SD-50.CFG configuration file if needed. This won't normally be needed, since Pc•MACs has already configured the Sd-50 for you.
- 7) **Schedule.sch:** (Optional) 365 day schedule or playing shows and sounds (only for the [AutoDownload 'Target'](#) Sd-50/8 or Sd-50/40, and only if a schedule was entered)

### Contents of the drag-n-drop folder for Sd-25s w/DMX:

For **Sd-25s w/DMX**, Pc•MACs creates a drag-n-drop folder for each **Sd-25** in your project. Inside this drag-n-drop folder are all the SoundFiles needed by the **Sd-25**, along with a text file telling you what the proper settings for the **Sd-25's** dipswitches are:

- 1) **SoundFiles:** Pc•MACs will copy the appropriate SoundFiles from your 'Media' folder for this project, and put them into the 'root' level of this Sd-25 drag-n-drop folder.
- 2) **'Set' file:** This is a text file that has a listing of all the SoundFiles in the folder, and the dipswitch settings needed by the Sd-25 w/DMX that are needed to configure and address it.

### Contents of the drag-n-drop folder for each BrightSign video player:

For each BrightSign video player triggered thru GPIO using either the **v-Hd-to-DMX** or **v-Hd-to-1/4J6** and running the GilderScript, Pc•MACs will create a drag-n-drop folder. Within this folder, Pc•MACs will create the necessary 'playlist' folders and place the video files you have used into each of these. You will need to manually add the GilderScript to the folder. Optionally, you can also add a 'Background loop' folder to any video drag-n-drop folder. Any VideoFiles found in a 'Background loop' folder will be played whenever no triggered files are being played.

- 1) **Playlistxxx folders:** Each playlist folder contains all the VideoFiles you used in all of your shows on this player. Pc•MACs will copy the VideoFiles from your 'Media' for this project and put them into the appropriate 'Playlist' folders.
- 2) **'GilderScript' file:** This files has the name 'Autorun.brs'. The GilderScript is sold separately, so you will need to drag it to the Sd card or this drag-n-drop folder. If added to this drag-n-drop folder, it will remain in place through subsequent AutoDownloads.
- 3) **'Background Loop' folder:** If your application needs a background loop to play between the triggered videos, you will need to create a 'Background

Loop' folder, and drop the videos you want to play into it. If added to this drag-n-drop folder, it will remain in place through subsequent AutoDownloads.

At the end of the AutoDownload process, Pc•MACs will have made a drag-n-drop folder for each [Target Device](#) and Audio/Video device that your project uses. Pc•MACs automatically opens the folder for the AutoDownload '[Target Device](#)', which contains the actual AutoDownload file and 'set' file15. Just drag-n-drop the content of each of these folders (NOT the entire folder!) onto blank flash cards, and insert them into your players.

## Import from Eprom...

*This command requires a MACs-License*

This command is used when you need to import previously saved Eprom files back into Pc•MACs. It can also be used to import data from other programs that then use Pc•MACs as the output device. The files to be imported must be straight binary files as would be saved by the Save as Eprom command with the 'Multi Channel' option turned 'Off'. To use this command:

- 1) Make a blank show that has enough channels and length to hold the files that are to be imported.
- 2) Open this command and select the Eprom files to be imported. The files must have the extension '.R??', where the '??' is the HEX address where the data is to go. The file with the extension '.R00' will be imported into channel 00h. '.R01' will go into channel 01h, etc..

This command can also be used to import animation data from another source. It is a 'legacy' command, that currently only supports up to 256 channels.

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15 The 'Set' file is a simple text file with the listing of the shows and settings which were used in the AutoDownload file.

## Import from AutoDownload...

This command requires a MACs-License

This command is used when you need to import previously saved AutoDownload files back into Pc•MACs. You must already have the original, or a recreated site file. When you invoke this command, it will ask you to open the AutoDownload file to import, and then which show within that AutoDownload.



## Save as Macro... (<Control>+M)

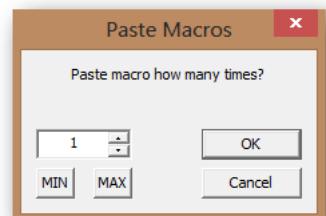
This command is used to save any animation sequence which is currently selected in the OffLine Editing Window to a 'Macro' file (FileName.MAC). Once saved, it can then be pasted back into this or any other show using the Insert Macro and Insert Multiple Macros commands. This command works just like an '[Edit menu's Copy command](#), except the data is written to the disk file as well as the 'clipboard'.

## Insert Macro... (<Alternate/Option>+M)

This command is used in the OffLine Editing Window when you want to insert a previously saved 'Macro' file. The Macro is inserted to the selected channels at the point you have selected on the OffLine Editing Window. If there is a mismatch between the number or types of channels selected and those in the Macro, Pc•MACs will warn you and give you the opportunity to cancel the command. If the amount of time selected on the OffLine Editing Window is different from the length of the Macro file, then the data after the insertion point will be moved forward or back in time, as appropriate (data at the end of the show will be duplicated or shoved off into limbo as needed). The '[Preferences' menu's 'Cut/Paste Options](#)' can be set up to automatically clean up any jumps that might be created in analog channels at the beginning and/or end of the inserted Macro file.

## Insert Multiple Macros...

This command works exactly like the Insert Macro Command above, except that it allows you to insert between one and 9,999 copies of the Macro. If the '[Preferences' menu's 'Cut/Paste Options](#)' have been set up to clean up the ragged ends of the Macros as they are inserted, the 'clean up at end' will only be



done after the last copy of the Macro has been pasted in.

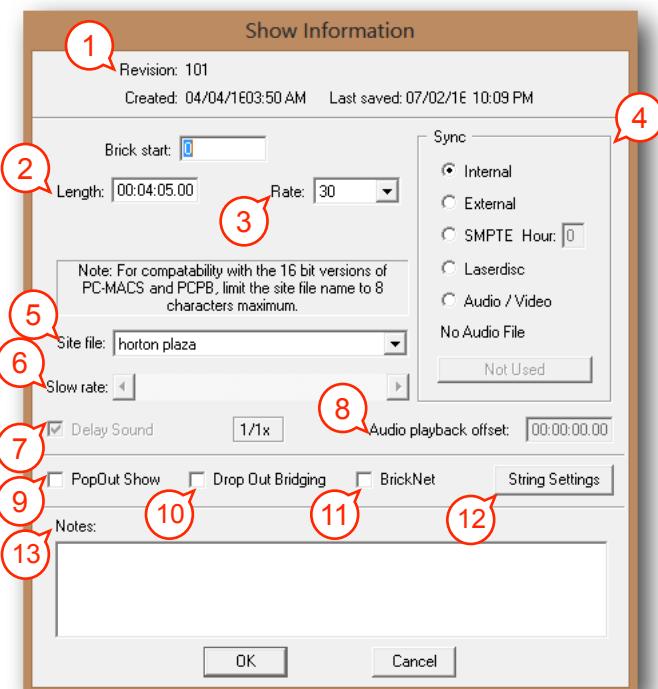
## Show Information... (<Alternate/Option>+I)

This command opens the '[Show Information....](#)' dialog. If this looks familiar to you, that is because it is identical to the '[New Show](#)' dialog, except in name.

You can open this dialog to change the show's frame rate or length, or any of the other settings you may need to change since you first created the show. The only setting that you should avoid changing on an existing show (unless you really know what you are doing) is the site file.

### 1) Revisions:

The block at the top of the dialog shows the creation and 'last saved' timestamps. The 'revision' is incremented on each 'save'.



### 2) Show Length:

The length of the show is set here. This can be changed at any time. When you close the dialog, Pc•MACs will ask you if you want to stretch or compress any existing show data to fit the new length, lop off the existing data (if the show was shortened) or pad with default values (if the show was lengthened), or 'cancel' to leave the length unchanged.

### 3) Frame rate:

Typically this is left at 30 FPS. It can be changed at any time. If it changed, when you close the dialog, Pc•MACs will ask you if you want to stretch or compress any existing show data to fit the new frame rate, lop off the existing data (if the frame rate was increased) or pad with default values (if the frame rate was decreased), or 'cancel' to leave the frame rate unchanged.

**you if you want to stretch or compress any existing show data to fit the new frame rate, lop off the existing data (if the frame rate was increased) or pad with default values (if the frame rate was decreased), or 'cancel' to leave the frame rate unchanged.**

### 4) Sync:

This sets the clock source for the frame rate used by this show. No matter the sync used on the final show, all shows are normally programmed using the 'internal' setting.

The ‘external’, ‘Smpte’ and ‘DVD/LaserDisc’ settings are currently only used to tell a Br-Brain4 that it will need to clock from one of these sources after the show is AutoDownloaded to it. In the future, Pc•MACs will support using a connected Br-Brain4 as a remote external, Smpte or DVD/LaserDisc timecode reader during programming.

The ‘Audio/Video’ sync is the legacy method of synchronizing Pc•MACs with an audio or video file. Although this legacy method can still be used, the current method of adding Drag-n-Drop Triggers to the OffLine Editing Window timeline is the recommended way of adding audio or video playback to a show.

Until Pc•MACs supports using a Br-Brain4 as a remote timecode reader, the recommended method of programming shows that use Smpte or DVD/LaserDisc timecode is to set the show’s timecode flags for ‘external’, ‘Smpte’ or ‘DVD/LaserDisc’ timecode, but then to add the audio or video file to the OffLine Editing Window timeline using the Drag-n-Drop Triggers. It can then be programmed like any other show. Once AutoDownloaded, the Br-Brain4 will see the timecode flags and use the appropriate timecode reader for the shows in the final installation.

## 5) Site File:

This is the most important setting on this dialog. The ‘Site’ file is where Pc•MACs stores information about everything Pc•MACs is controlling at a specific ‘site’. This includes types of inputs and outputs, the names you have given them, the console and other presets, what shows were included in any AutoDownloads and much more.

Depending on the type of shows you do, a ‘Site’ could be an attraction at a theme park, a display in a museum, a fountain, or a stand-alone ‘prop’ built by the dozens for the haunt market. No matter what type of shows you are building, each ‘Site’ should have its own uniquely-named ‘Site’ file. You should not use the default ‘PcMACs.ste’ ‘Site’ file for any ‘real’ shows. If you do, you have a good chance of screwing up your shows if you were to use it again on another project.

All the shows that run at a ‘Site’ should always use the same ‘Site’ file. This saves you from reentering the same stuff each time you start a new show. If you modify or add a preset, change the name of an output, or anything else, it will instantly and automatically be applied to all other shows which use the same ‘Site’ file.

To select an existing ‘Site’ file, there is a drop-down that lists every ‘Site’ file name that you have ever used on your computer, or if you scroll to the top of the list, you can enter a ‘New’ site file name or ‘Duplicate’ the current ‘Site’ file.

**6) Slow Rate:**

*Not all computers support this function.* This allows you to play and record your shows at a temporarily slowed frame rate. Set the slider back to '1/1x' to play your show at the normal frame rate.

**7) Delay Sound:**

*This is part of the legacy Audio/Video sync, and shouldn't be used on new shows.* Leave this checked to delay the Audio/Video file start by the amount of time set in the Audio Playback Offset.

**8) Audio Playback Offset:**

*This is part of the legacy Audio/Video sync, and shouldn't be used on new shows.* This sets the time that the Audio/Video file is delayed after the start of the show.

**9) PopOut Show:**

This tells the Br-Brain4 that the show which is playing is a PopOut Show. See the section of the manual on Multi-Sequencer and PopOut shows for details on this.

**10) Drop Out Bridging:**

If running from the Smpte or DVD/Laserdisc timecode, tells the timecode reader on the Br-Brain4 what to do if the timecode stops unexpectedly. If not checked, the show will freeze at the frame where the timecode stopped. If checked, the show will drop onto internal timecode and continue playing towards the end. In either case, if the timecode picks back up before the end of the show is reached, the show will resume following the timecode.

**11) BrickNet:**

Tells the Br-Brain4 to listen for timecode coming from another Br-Brain4 through the BrickNet, rather than listening to the timecode indicated by the timecode flags. This is used to stack Br-Brain4s for shows that go beyond four DMX-512 universes.

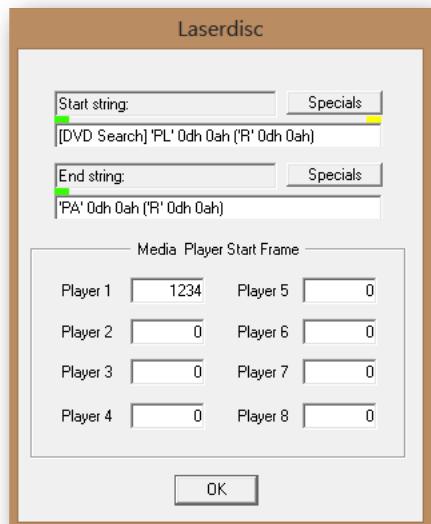
## 12) String Settings:

This opens the dialog where you enter the strings used to start or stop a DVD/LaserDisc player.

By default, the LaserDisc strings are named ‘Start String’ for the string that is sent at the beginning of a show and ‘End String’ for the string that is sent at the end of the show. If desired, a unique name for each string can be entered.

The ‘Specials’ button allows you to enter several commonly needed string values, as well as several ‘special’ markers for your strings:

- a) Restore: This clears out everything from the string entry field.
- b) String: You can enter an ascii string here. When you click ‘OK’, single quote marks are added and the text is moved to the string entry field.
- c) Numeric Values: This gives examples of decimal, hex and octal numeric values. You can enter a decimal value here. A green light indicates that your number is formatted properly.
- d) Make Pretty: This attempts to clean up a string that is not properly formatted.
- e) Return: Inserts a <Carriage Return> character = 0x0d.
- f) Line Feed: Inserts a <Line Feed> character = 0x0A.
- g) Return/LineFeed: Inserts both a <Carriage Return> and <Line Feed> = 0x0D 0x0A.
- h) Get Anything: This is used when you need to get a character back from the serial port, but don’t care what the value of that character is.
- i) Talk All & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through all eight ports, and listen to only the first port. The Br-SDC8 stays in this mode until another MUX command is received.
- j) Talk & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 1. The Br-SDC8 stays in this mode until another MUX command is received.



- k) Talk & Listen 2: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 2. The Br-SDC8 stays in this mode until another MUX command is received.
- l) Talk & Listen 3: This is MUX command used with the Br-SDC8 to send the following serial data out through port 3, and listen to only returned data through port 3. The Br-SDC8 stays in this mode until another MUX command is received.
- m) Talk & Listen 4: This is MUX command used with the Br-SDC8 to send the following serial data out through port 4, and listen to only returned data through port 4. The Br-SDC8 stays in this mode until another MUX command is received.
- n) Talk & Listen 5: This is MUX command used with the Br-SDC8 to send the following serial data out through port 5, and listen to only returned data through port 5. The Br-SDC8 stays in this mode until another MUX command is received.
- o) Talk & Listen 6: This is MUX command used with the Br-SDC8 to send the following serial data out through port 6, and listen to only returned data through port 6. The Br-SDC8 stays in this mode until another MUX command is received.
- p) Talk & Listen 7: This is MUX command used with the Br-SDC8 to send the following serial data out through port 7, and listen to only returned data through port 7. The Br-SDC8 stays in this mode until another MUX command is received.
- q) Talk & Listen 8: This is MUX command used with the Br-SDC8 to send the following serial data out through port 8, and listen to only returned data through port 8. The Br-SDC8 stays in this mode until another MUX command is received.

String entries can be separated by spaces, a comma, or a comma and spaces. If the string is entered correctly, a green light will appear above this field. Numeric values can be entered any of several different formats:

Ascii strings should be enclosed within single or double quotes.

Decimal values can be between any number of digits, as long as the value is between zero and 255.

Hexadecimal numbers can be entered as dh, 0dh, 0xd or 0x0d.

For old timers, octal values are entered as four digits with the leading digit a zero, the second digit 0-3, and the remaining two digits 0-7.

You can enter the starting frame number for a maximum of eight DVD/LaserDisc players. If there are multiple players, they are connected to the Br-Brain4 via a Br-SDC08, which multiplexes the communications to each of the player automatically. A zero value tells the Br-Brain4 to skip that player.

## Page Setup... (<Alternate/Option>+P)

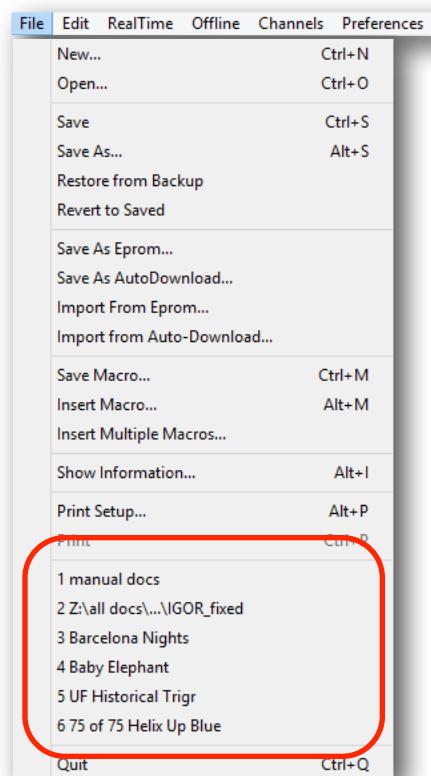
This is the standard Windows printer setup dialog.

## Print... (<Control>+P)

Depending on that window is in the foreground, this standard Windows dialog will allow you to print the current show's information or channel assignments.

## Recent Shows

Windows automatically saves the names of recently used Pc•MACs show files, and stores them in a list under the '[File](#)' menu. You can RightClick on these to quickly reopen any of these shows.



## Quit (<Control>+Q)

This command is used to exit Pc•MACs and return to the Windows operating environment. If the currently loaded show has been altered, Pc•MACs will ask if you would like to save it before exiting.

## 'Edit' Menu

The 'Edit' Menu is familiar to anyone who has operated any Windows programs. It is where all editing commands are located. Most of these are also available as command key equivalents as well. As much as possible, we followed the Macintosh standards for the usage of these keys (as Microsoft themselves are now doing). As is standard in Windows programs, this pulldown isn't available from within most dialog boxes, but the basic command key equivalents to cut, copy, and paste generally are.

Many of the commands are specific to the OffLine Editing Window, and will not be visible unless this window is open and active.

### Undo/Can't Undo (<Control>+Z)

Standard Windows command that allows the last command to be undone.

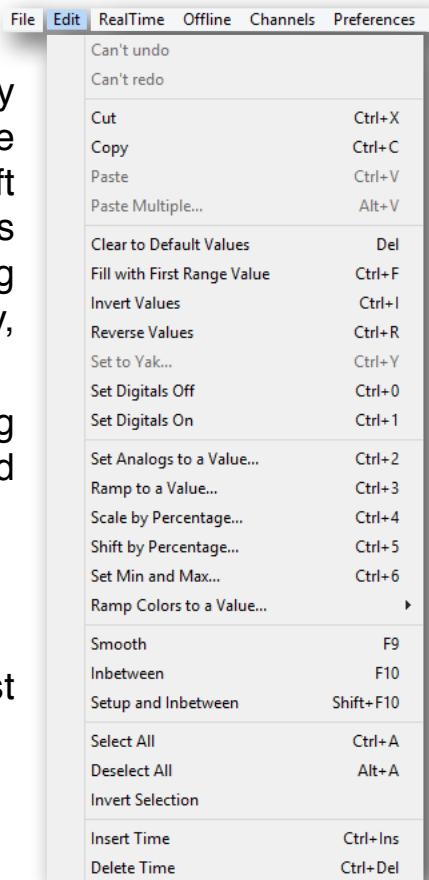
### Redo/Can't Redo (<Shift>+<Control>+Z)

Standard Windows command that allows the last command to be repeated.

### Cut (<Control>+X)

*This command is only available if text in any editable field, or analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

Standard Windows command removes whatever has been selected and moves it to the 'clipboard' for temporary storage. When editing text or animation data, everything that follows the removed area will slide forward to fill the void this command creates. In the OffLine Editing Window, animation data at the end of the show will be duplicated as needed. When cutting animation data from the OffLine Editing Window, the '[Preferences](#)' menu's '[Cut/Paste Options](#)' can be set up to automatically clean up any jumps that might be created in analog channels at the point where the data was removed.



## **Copy (<Control>+C)**

*This command is only available if text in any editable field, or analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

Standard Windows command that copies the selected text or animation data to the ‘clipboard’ for temporary storage without removing it from where it was copied from.

## **Paste (<Control>+V)**

*This command is only available if text from an editable field, or analog and/or digital channels from the OffLine Editing Window have been copied or cut into the clipboard, and a suitable destination for that data has been selected.*

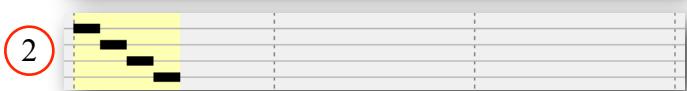
Standard Windows command which is used to copy any animation data or text which has been moved to the ‘clipboard’ back to a new location you have selected for it. If the area you have selected for this animation or text to go is a different length from the data stored on the clipboard, any data that follows it will be shifted forward or backwards as needed to make room (data at the end of the show will be duplicated or shoved off into limbo as appropriate). When pasting animation data in the OffLine Editing Window, the [‘Preferences’ menu’s ‘Cut/Paste Options’](#) can be set up to automatically clean up any jumps that might be created in analog channels at the beginning and/or end of the inserted ‘clipboard’ data.

## Paste Multiple... (<Alternate/Option>+V)

*This command is only available if text from an editable field, or analog and/or digital channels from the OffLine Editing Window have been copied or cut into the clipboard, and a suitable destination for that data has been selected.*

Use the right mouse button to draw in a chase pattern on these digitals. You should end up with a pattern that looks something like a staircase ①.

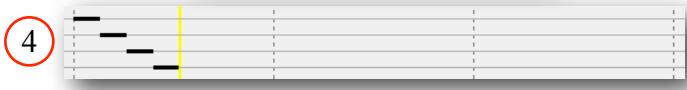
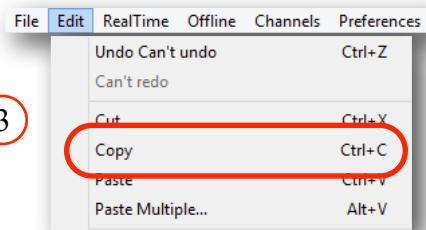
LeftClick in the white background of the window and slide to the left or right to select your staircase ②.



Select the 'Copy' command under the '[Edit](#)' menu (<Control>+C) ③.

Select any single point on the OffLine Editing Window by clicking on it with the left mouse button. In this sample, the selection is immediately after the first 'staircase', as shown by the vertical yellow line ④.

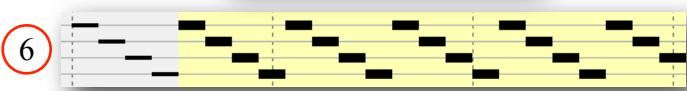
Select the '[Edit](#)' menu's 'Paste Multiple...' command (<Option>+V). Enter in the number of times you would like to see this chase pattern repeat and click 'OK' ⑤.



The 'copied' pattern will repeat for the number of times you selected, or until it reaches the end of your show ⑥.

Note that if analogs are pasted, each iteration is automatically 'cleaned up' at each end by the '[Preferences](#)' menu's '[Cut/Paste Options](#)'.

If you have a stretch of time selected, go ahead and set the number of times you want to paste to some enormous value. The Paste Multiple will only paste in the number of iterations as will fit.

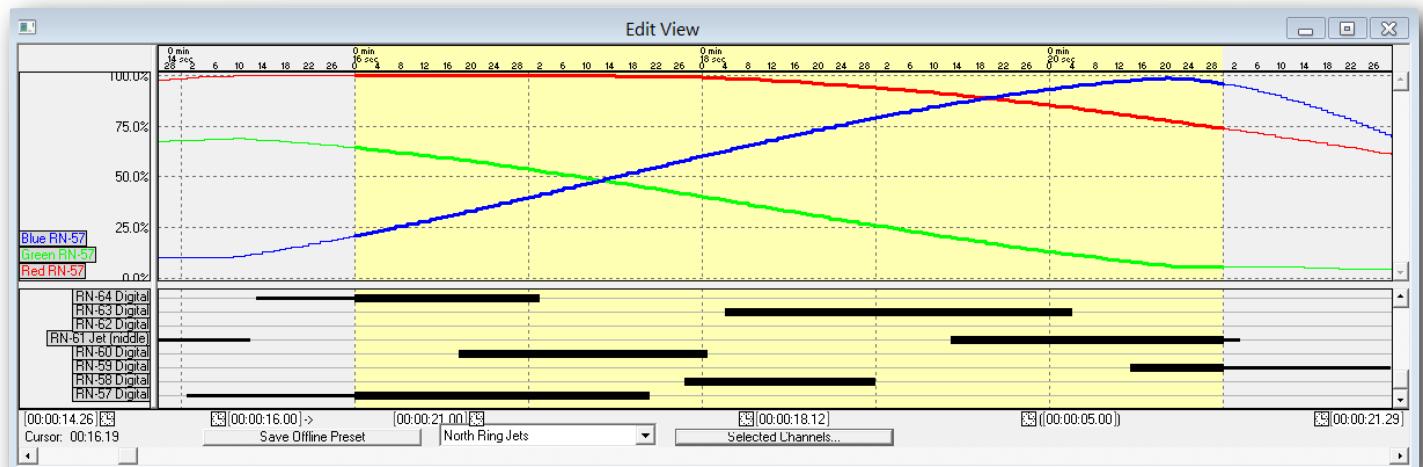


## Clear to Default Values (<Delete>)

*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

It is used to remove text or animation data without copying it to the ‘clipboard’. When Clearing text, it is simply removed. When clearing animation data on the OffLine Editing Window, the data is set back to its default value in the selected area.

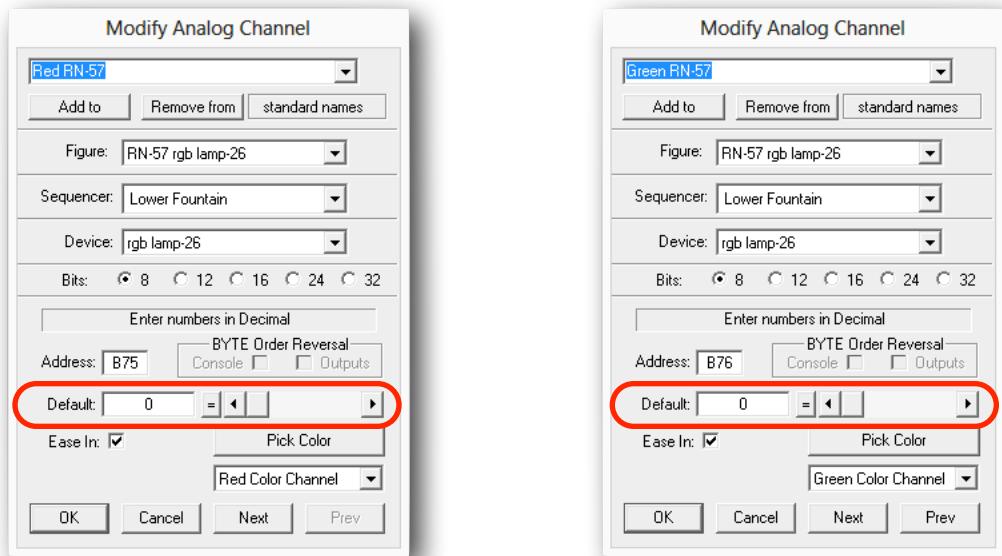
Before: A five second stretch of time containing both analog and digital channels has been selected:



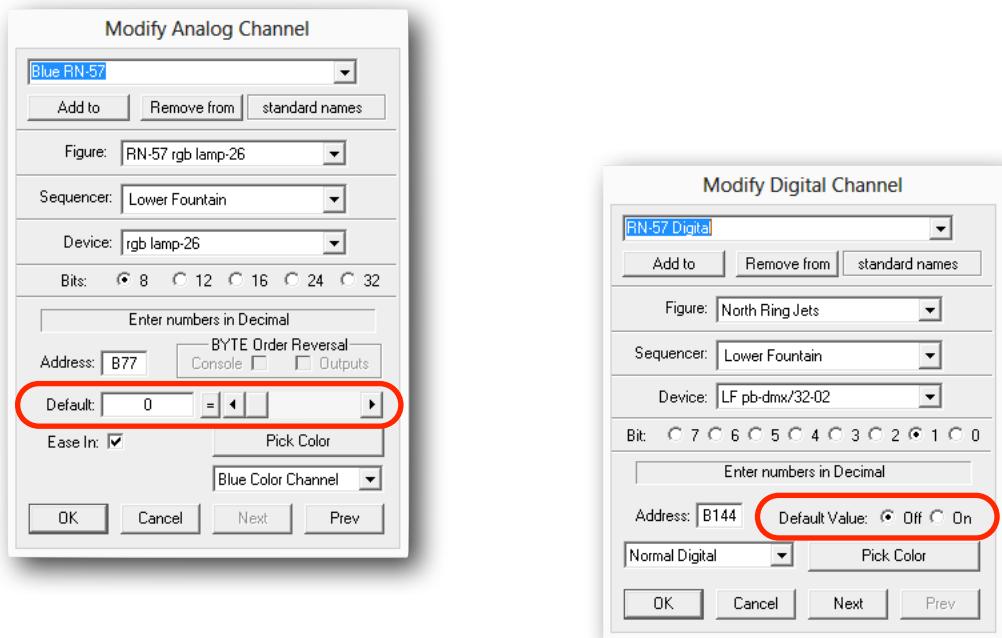
After: All the selected channels have been set to their ‘default’ levels for the five selected seconds:



For the Red and Green analogs, the default (set in the Channel's Setup dialog from the [Channels List](#)) is 0%:



The blue has a default of 50%:



The digital outputs all have a default value of 'OFF', as can be seen by their response to this command.

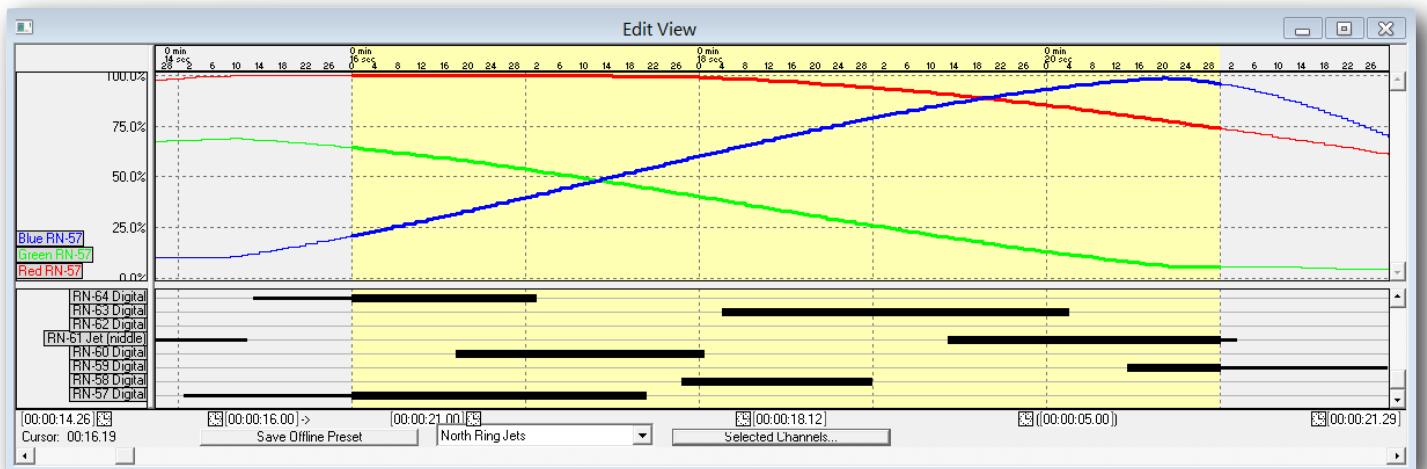
If the '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, Pc•MACs will automatically clean up any jumps this command might make in the analog channels.

## Fill with First Value (<Control>+F)

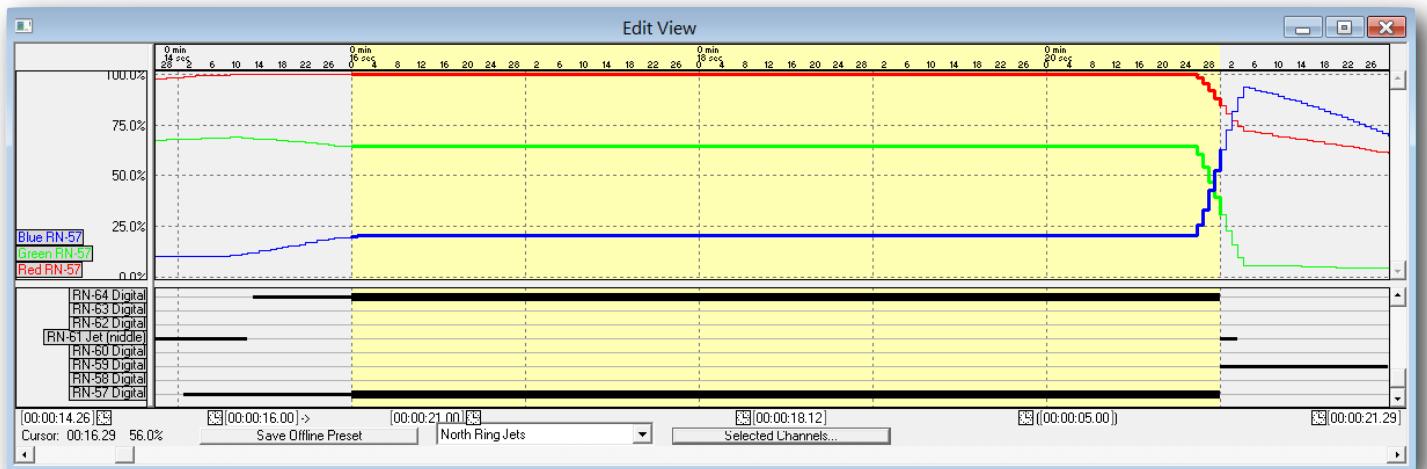
*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

It forces any selected analog or digital channel(s) to whatever value they have at the start of the selected area. If the ['Preferences'](#) menu's '['Cut/Paste Options'](#)' are enabled, then Pc•MACs can automatically clean up any jumps this command might make in the analog channels.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The value the first selected frame of all the selected channels have been duplicated through the five selected seconds:



The '['Preferences'](#) menu's '['Cut/Paste Options'](#)' are enabled, so Pc•MACs

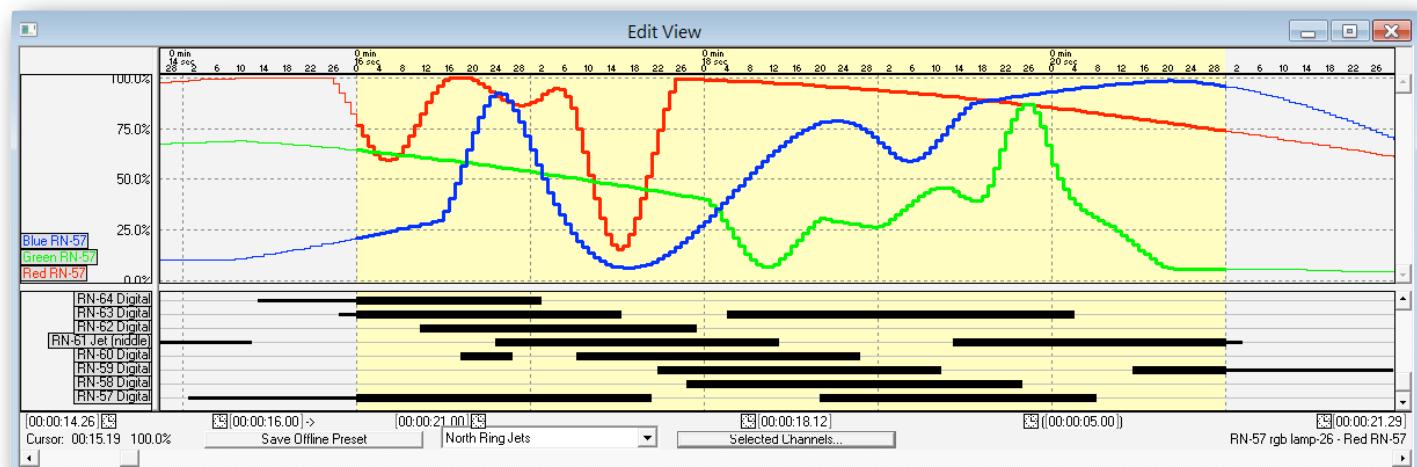
automatically cleaned up any jumps this command might have made in the analog channels.

## Invert Values (<Control>+I)

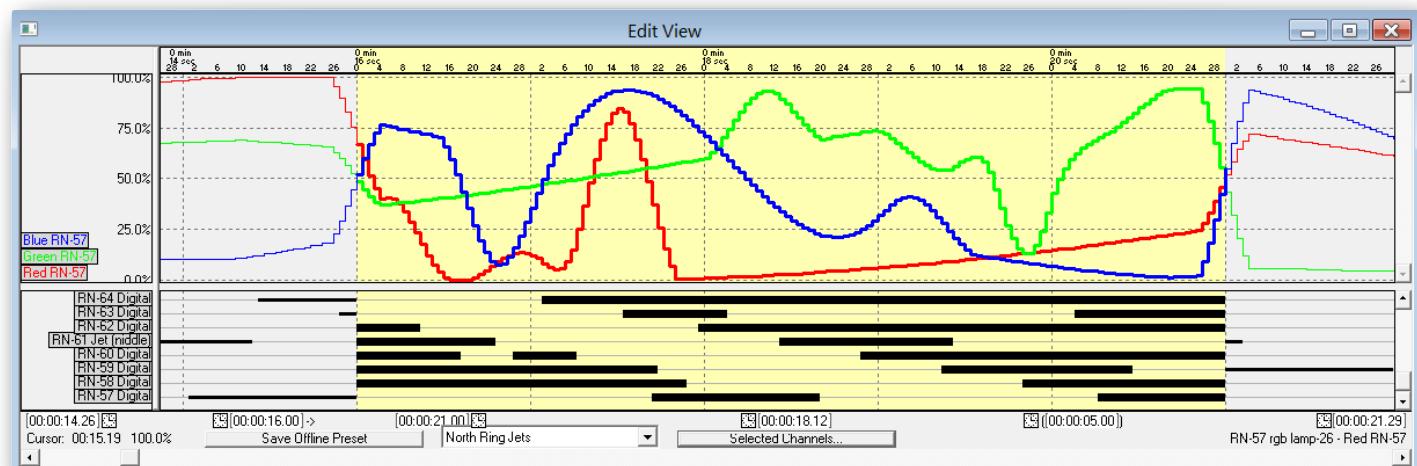
*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

It simply reverses the conditions of any selected analog or digital channel(s). A digital channel which was 'On' will be forced 'Off'. An analog value will be inverted.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The value the first selected frame of all the selected channels have been inverted through the five selected seconds:



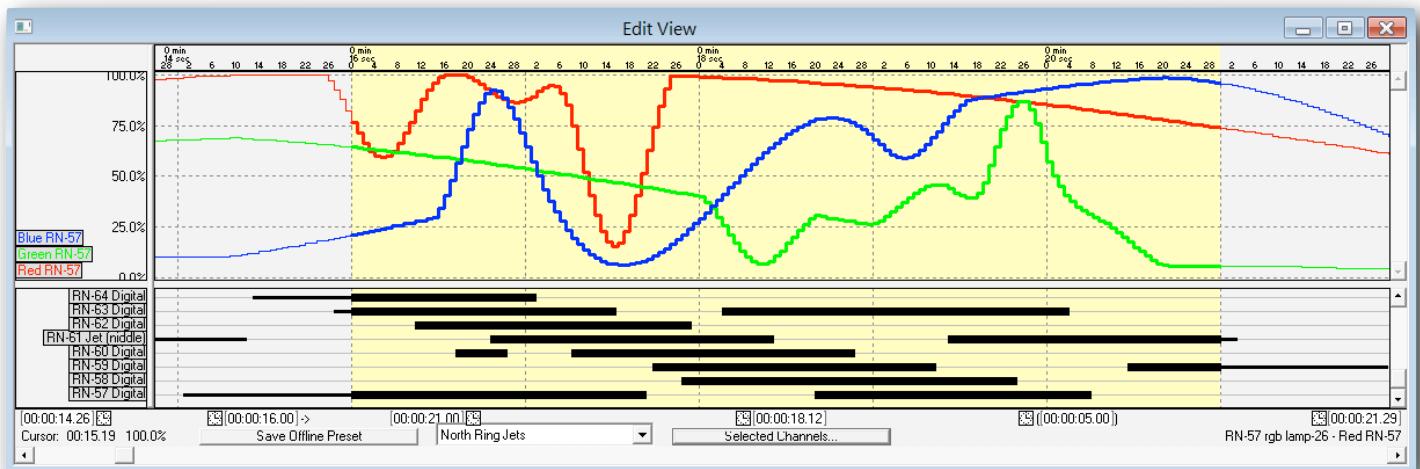
If digitals were ON, they are now OFF. If digitals were OFF, they will now be ON. If an analog value is at 25% before inverting, it will be at 75% after. The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

## Reverse Values (<Control>+R)

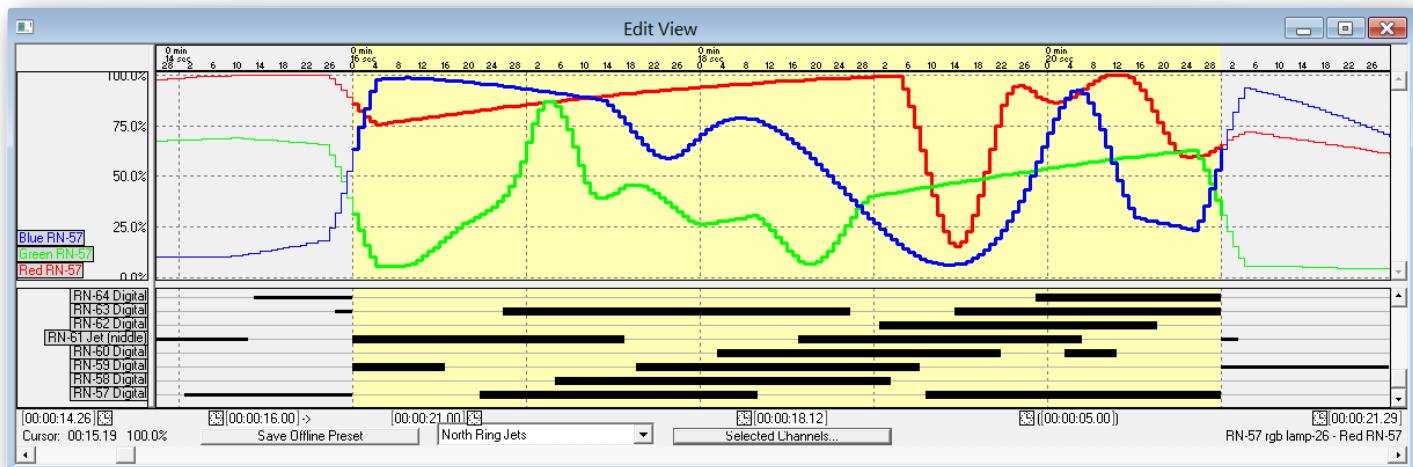
*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command is available when a stretch of one or more analog or digital channel(s) are selected on the OffLine Editing Window. It reverses any selected analog or digital channel(s) in time. Whatever actions were programmed in the selected channel(s) will now play 'backwards'.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The value the first selected frame of all the selected channels have been inverted through the five selected seconds:



The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

## Set To Yak... (<Control>+Y)

*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time. There also must be a Audio/Video file linked to the show (usually using a drag-n-drop trigger), with the waveform for the Audio/Video file displayed in the background of the Analog pane of the OffLine Editing Window.*

This command is used to paste the audio waveform from an AudioFile/VideoFile into either an analog or digital channel.

This is typically used to rough out programming of mouth movements and similar animation functions. This function can also be used to modulate lights or fountains to match an audio track. Examples of modulated lights include:

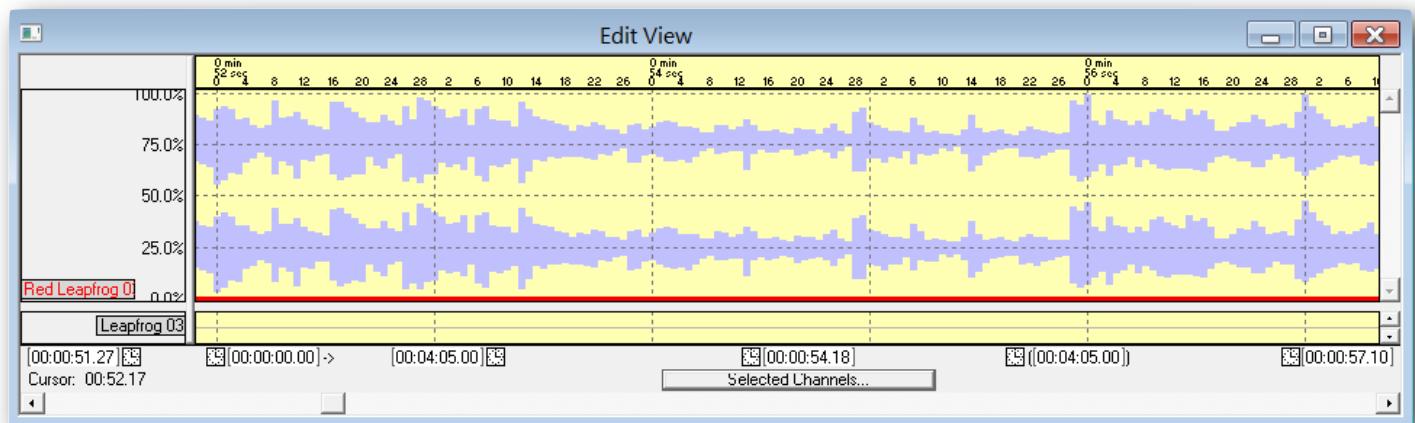
- Muzzle flashes of a gun or machine gun that follows each gunshot exactly
- Lights that modulates with the voice of a 'robot'
- Flicker flame effect that matches the sound of a fire
- Lighting that matches an Explosion or Thunder sound effect exactly
- If your budget is too small to build a moving mouth on a character, just modulate the light shining on the face of the figure or portrait with the voice track.

The best '[Yak](#)' results are always from AudioFile/VideoFiles that have only the sound you are trying to match. As an example, if you are programing a mouth

movement, you don't want all the other voice tracks, sound effects and music mixed into the same audio track. The 'Yak' function will follow ALL the sounds, and not just the voice you really want. It is not uncommon to create one or more AudioFile/VideoFiles that are used only for programming. These will typically have one or more voice tracks on one side, and all of the other sounds and voices mixed together on the second audio track as a reference. When you create a 'Yak', you select the voice track as the source.

If you have more than one voice on a single AudioFile/VideoFile track, you can program each mouth individually by selecting each animation function for each figure and programming them individually. As a shortcut, just select all the animation functions that need to be 'Yakked' and program them all at the same time. All the figures' mouths will move, no matter which one is supposed to be talking. Then use the OffLine Editing Window to 'Clear' the mouths on the figures that aren't talking.

Select only the analog and/or digital channel you want to use as the destination for the 'Yak' function. In this example we will choose one analog channel and one digital channel:

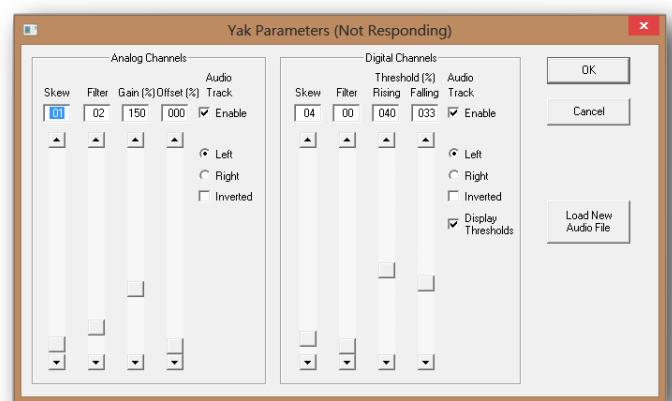


The shortcut for the 'Edit' menu's 'Yak' command is <Control>+Y:

For analog functions, the settings on the left of the dialog are used:

a) **Skew:** This offsets the resulting data forward in time to lead the audio. Lights typically need little or new skew. Solenoids typically need 3 to 15 frames of lead time.

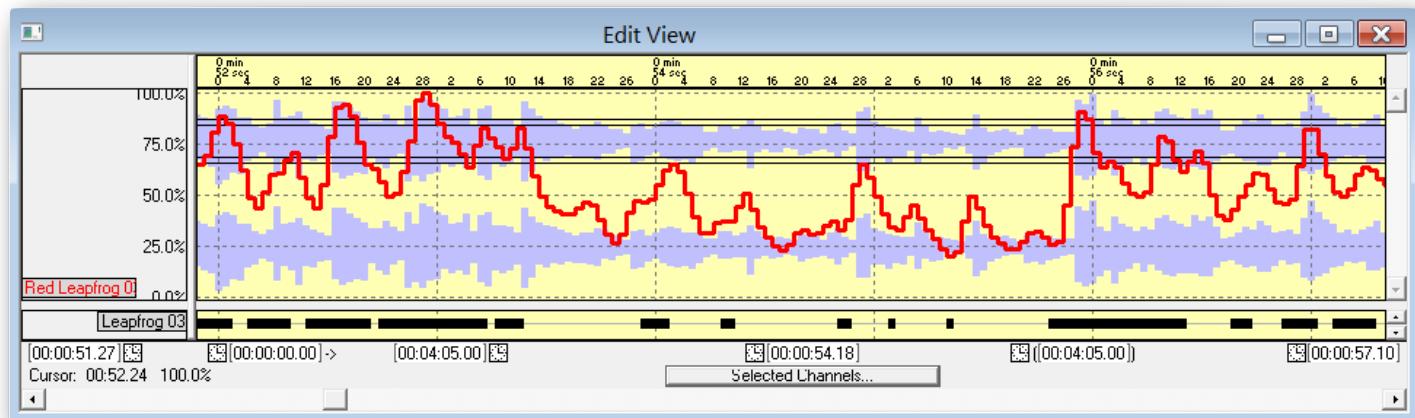
b) **Filter:** This keeps the resulting waveform from looking too much like



the New York City skyline. LEDs have zero inertial mass, so they can turn on and off rapidly. Motors and other mechanical devices don't.

- c) **Gain:** Amplifies the audio waveform for the desired output amplitude.
- d) **Offset:** This shifts the resulting waveform upwards, so that it never goes all the way to OFF. Typically used with lighting to keep it from turning all the way off between sounds.
- e) For digital functions, the settings on the right of the dialog are used:
  - a) **Skew:** This offsets the resulting data forward in time to lead the audio. Lights typically need little or no skew. Solenoids typically need 3 to 15 frames of lead time.
  - b) **Filter:** This keeps the resulting digitals from turning on and off too rapidly.
  - c) **Rising Threshold:** This is the audio level where the digital will turn ON.
  - d) **Falling Threshold:** This is the audio level where the digital will turn OFF. This is normally set to a level lower than the Rising Threshold.

You also have the option of displaying the rising and falling edge thresholds on the OffLine Editing Window. You can see this in the next illustration on the 'Left' (upper) audio waveform. There are also options to select and load a new SoundFile, to invert the results, and whether to use the right or left audio channel for the waveform.



These are the resulting analog and digital outputs created by the '[Yak](#)' parameters shown above. In most cases, there is a finite delay in the movements that you are controlling. The 'Skew' can be used to allow for this delay beforehand by offsetting the generated movements 'forward' in time.

When programming analog functions, you will need to experiment a few times with the 'gain' settings until the animation function matches the sound as best as it can. A setting of 150% is usually a good starting point for most audio files.

Digital functions are a bit trickier to set up. The ‘Rising’ threshold is the level where the audio will turn ON a digital output. The ‘Falling’ threshold is the level the audio has to drop below to turn OFF that same output. The ‘Skew’ offsets the functions ‘forward’ in time. You will want to always keep the ‘Falling’ threshold setting below that of the ‘Rising’ threshold. As with the Analog ‘[Yak](#)’ functions, you will need to experiment with these until they give the results you want.

In most cases, you will need to ‘clean up’ any mouth movement after programming with the ‘[Yak](#)’ function to make it ‘perfect’. As an example of some of the sounds that need to be manually edited:

‘M’ sound requires you to close your mouth

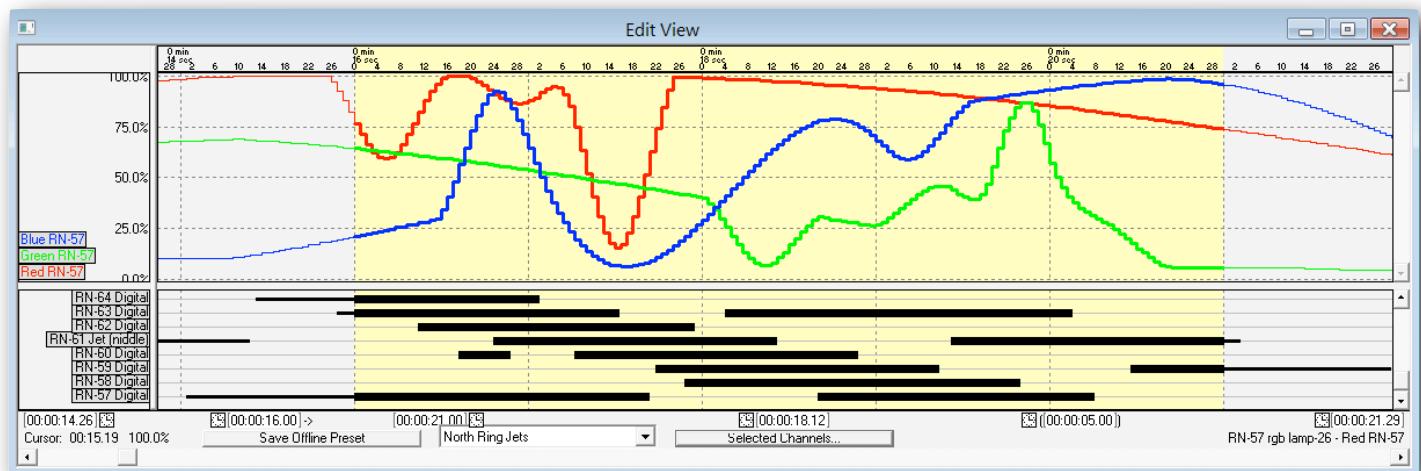
‘P’ requires you to pop the lips open quickly to make the ‘p’ sound.

## Set Digital Off (<Control>+0)

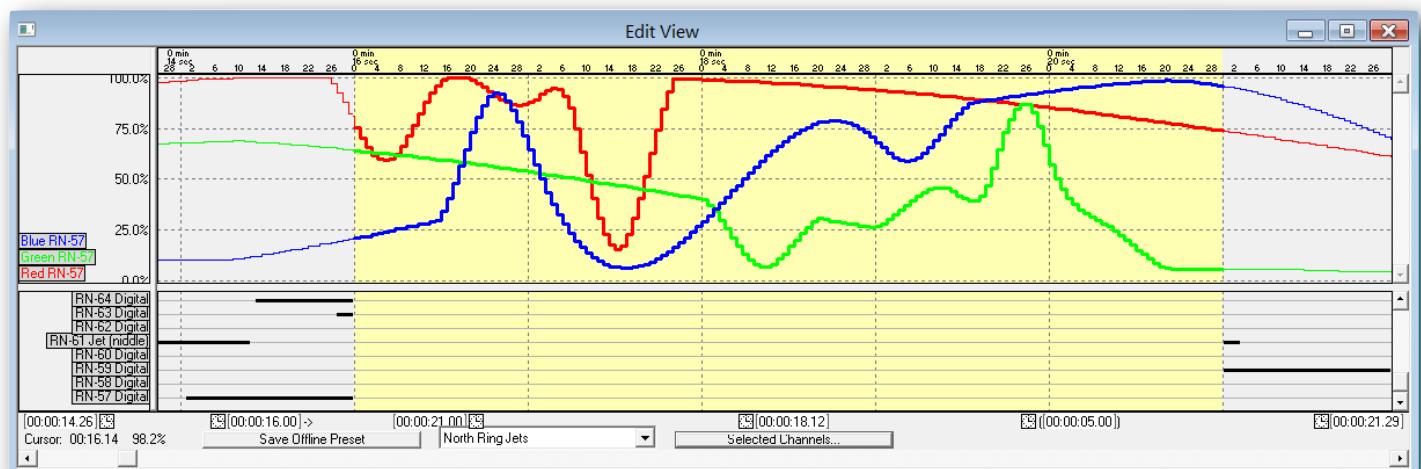
*This command is only available if one or more digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command forces any selected digital channel(s) to the 'Off' condition.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The value the first selected frame of all the selected channels have been set 'OFF' through the five selected seconds.



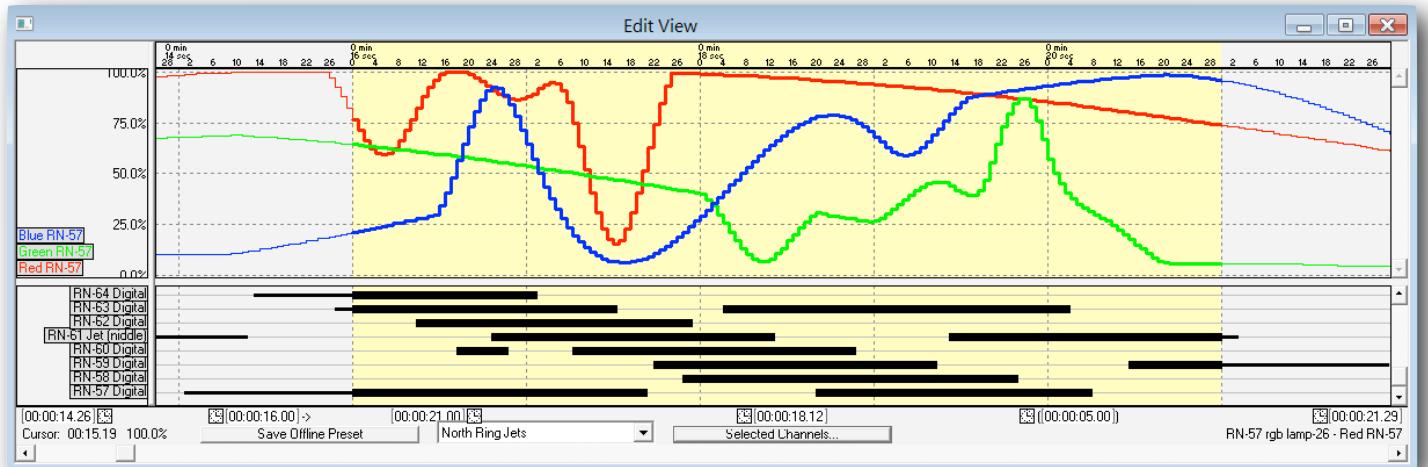
The selected analog channels are completely unaffected by this command.

## Set Digital On (<Control>+1)

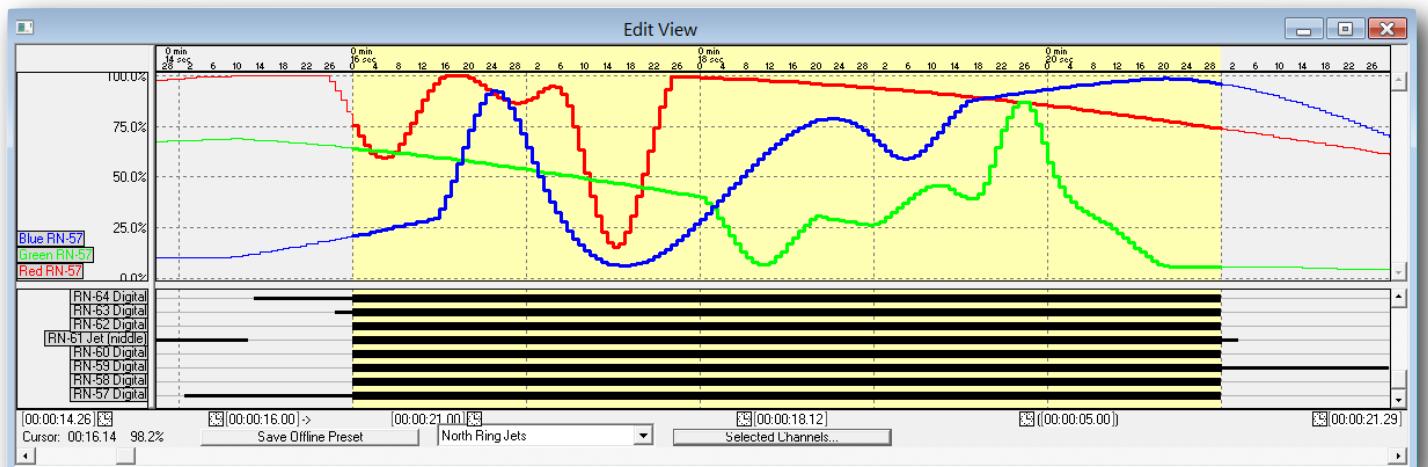
*This command is only available if one or more digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command forces any selected digital channel(s) to the 'On' condition.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The value the first selected frame of all the selected channels have been set 'ON' through the five selected seconds.



The selected analog channels are completely unaffected by this command.

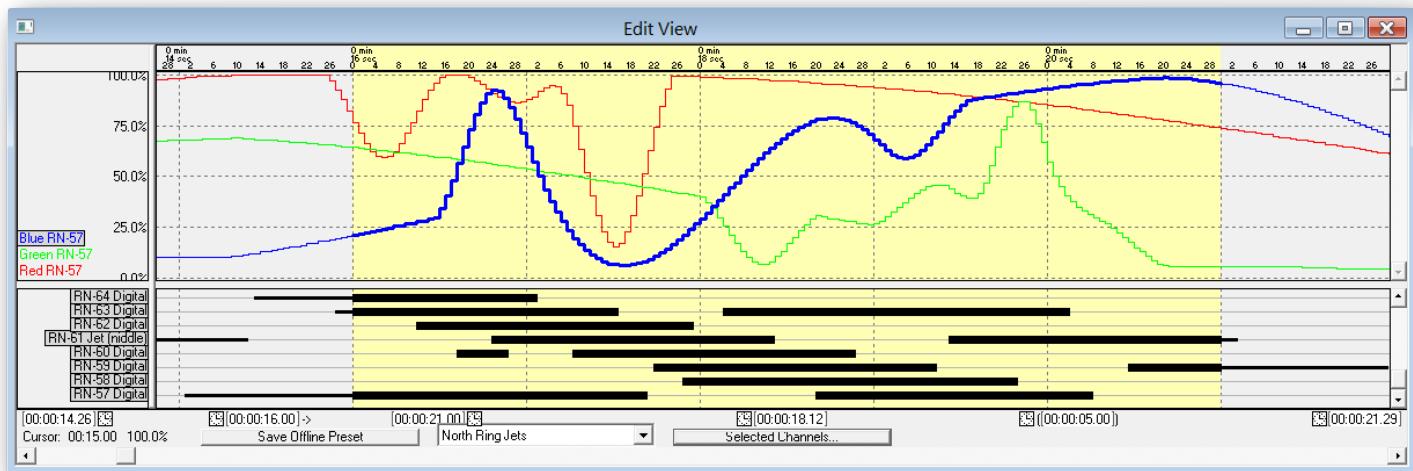
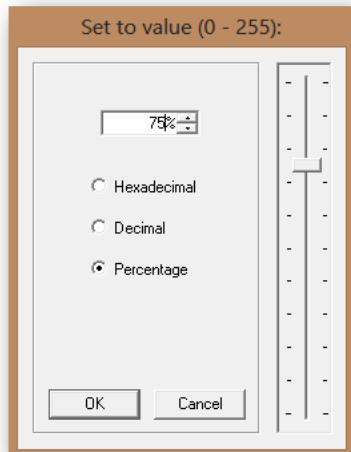
## Set Analogs to a Value... (<Control>+2)

*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

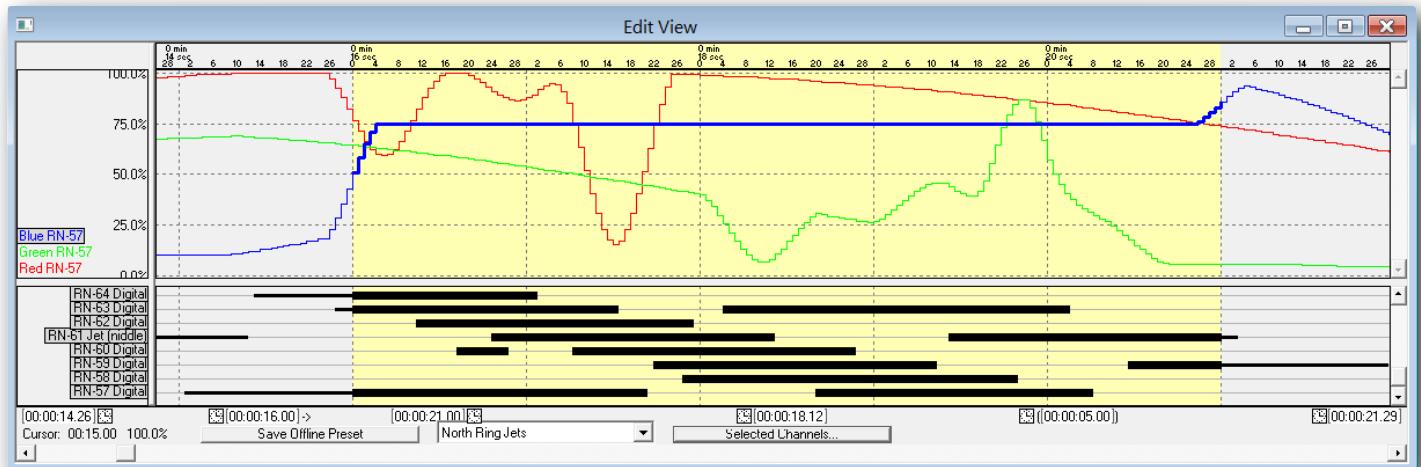
It sets any selected analog channels to the value you enter.

On the dialog that appears when you invoke this command, you can select the level to set the selected analog(s) to. If all the analogs are the same resolution, you can also select whether you want to use decimal, Hexadecimal or percentage values. If analogs with a mix resolutions have been selected, then you should only select to use percentage values.

Before: A five second stretch of time containing both analog and digital channels has been selected. Of all the analog channels shown, only the Blue one has been selected:



After: The value the Blue analog channel has been set to 75% through the five selected seconds.



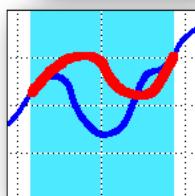
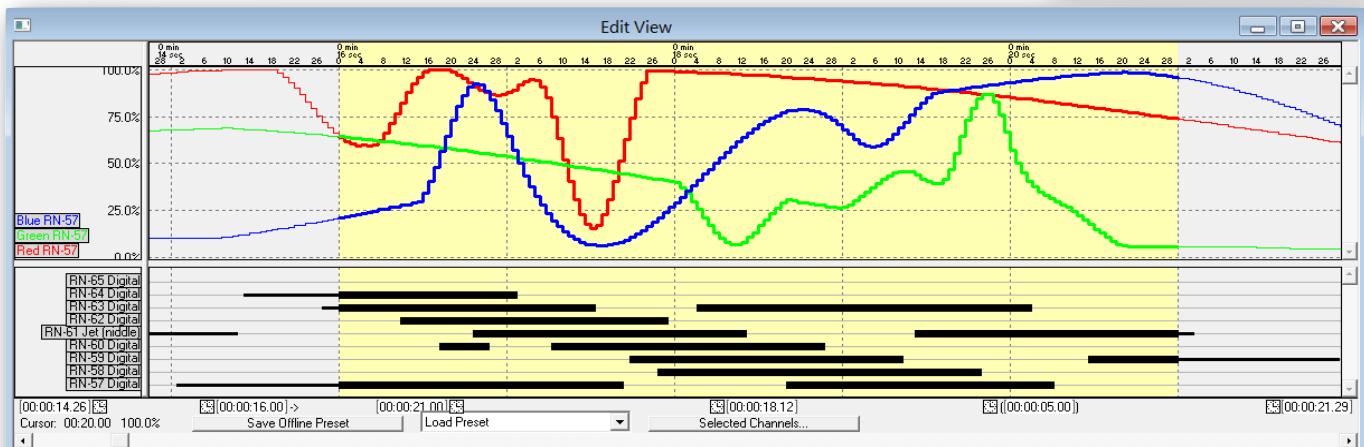
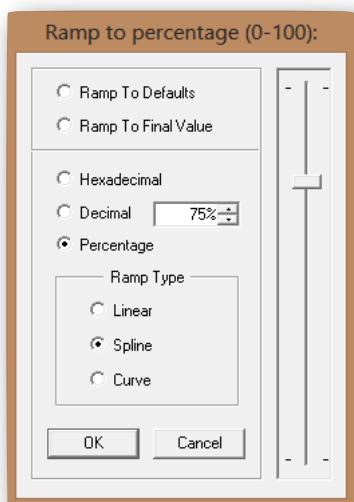
The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc-MACs automatically cleaned up any jumps this command might have made in the analog channels. The selected digital channels are completely unaffected by this command.

## Ramp to a Value... (<Control>+3)

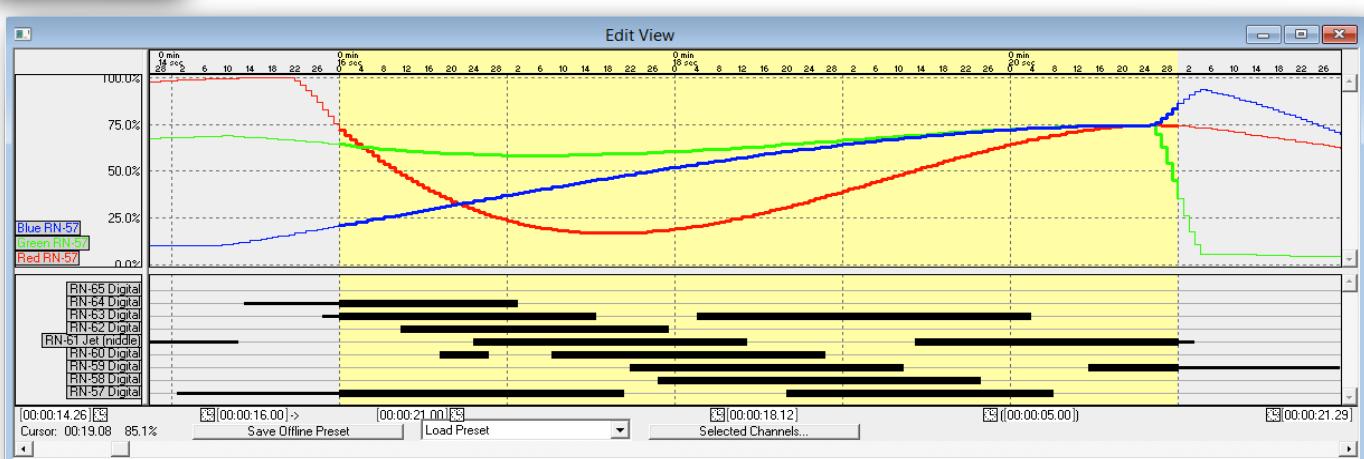
*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

It prompts you for an ending value for any selected analog channel(s). A Ramp, Curve or Spline will be generated on these analog channels from whatever levels they are at the beginning of the selected area to the value you have entered, which will be reached at the end of the selected area.

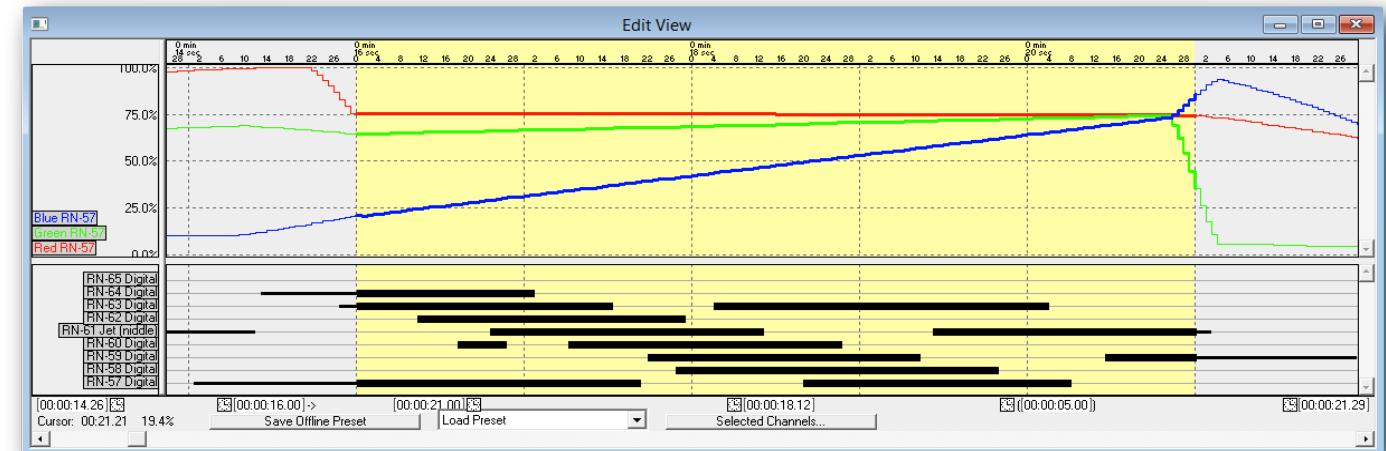
Before: A five second stretch of time containing both analog and digital channels has been selected:



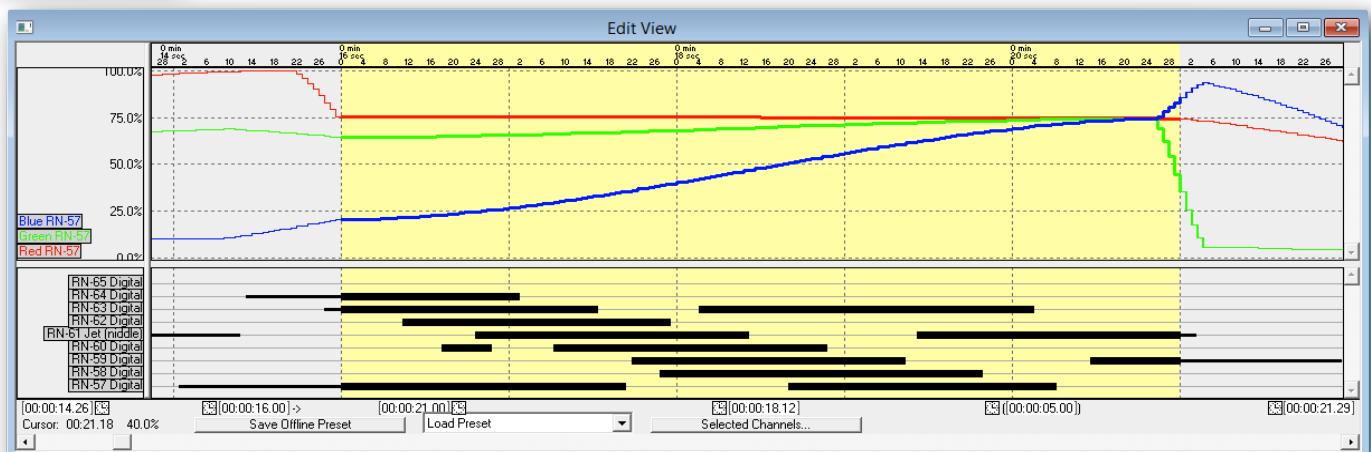
After #1: The selected analog channels have been ramped to 75% at the end of the selected area using a 'spline' curve. Note that the 'spline' tries to match the data outside of the actual edit area:



After #2: The selected analog channels have been ramped to 75% at the end of the selected area using a ‘linear’ curve. The ‘linear’ curve draws only straight lines between points. This tends to make whatever the system is controlling look somewhat ‘robotic’. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn’t give the movements the subtlety that it takes to make a show look like it is truly ‘alive’:



After #3: The selected analog channels have been ramped to 75% at the end of the selected area using a ‘S-Curve’. This type of curve always starts and ends with zero velocity. It pays no attention to what is happening outside of the actual edit area the way a ‘spline’ does:



The [‘Preferences’ menu’s ‘Cut/Paste Options’](#) are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

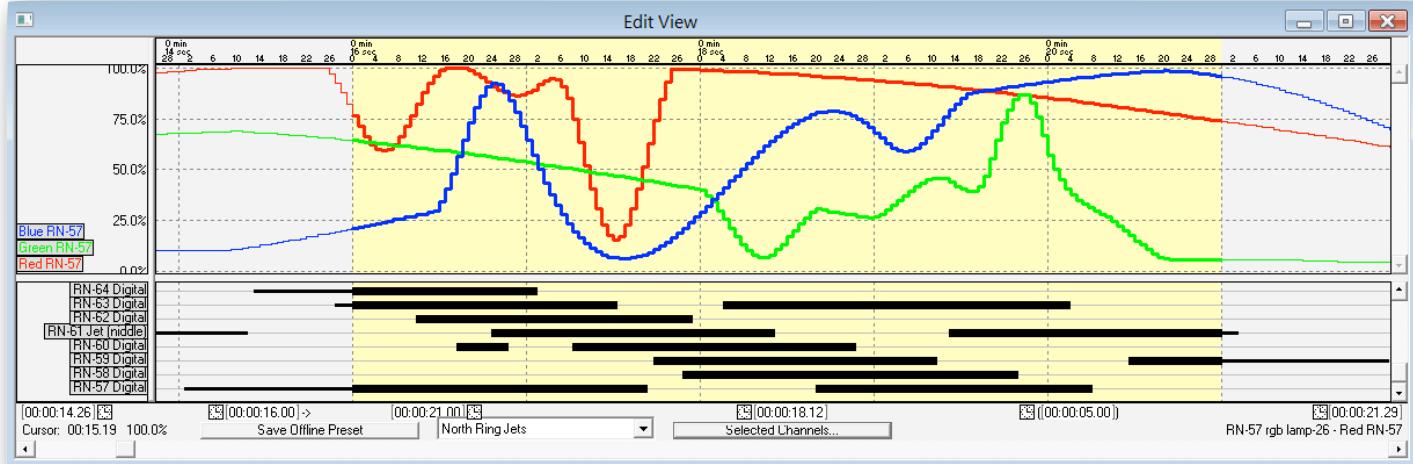
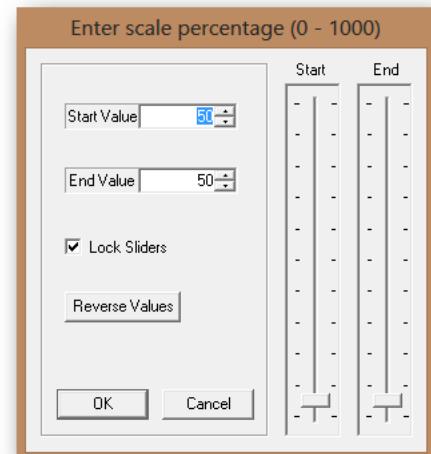
## Scale by Percentage... (<Control>+4)

*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This is an alternative version of the Rubberbanding tool's 'Scale' command. It works in exactly the same way, but allows you to enter numeric values for the scaling, or different beginning and ending values for the scaling.

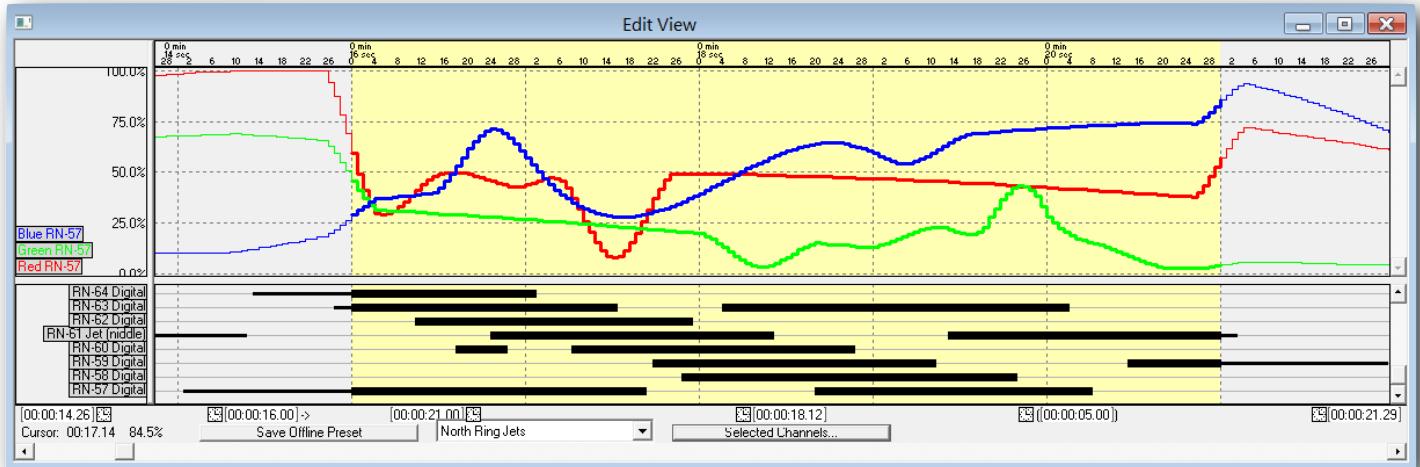
The scaling is based upon the 'default' position used for the analog function(s) being scaled. The 'default' position is set for each channel from the [Channels List](#) by double clicking on the channel's name. The further the analog is away from the 'default' position, the more the analog is scaled by this command.

Before: A five second stretch of time containing both analog and digital channels has been selected. The Red and Green Channels have their 'default' positions set to zero. The Blue's 'default' position is set for 50%:



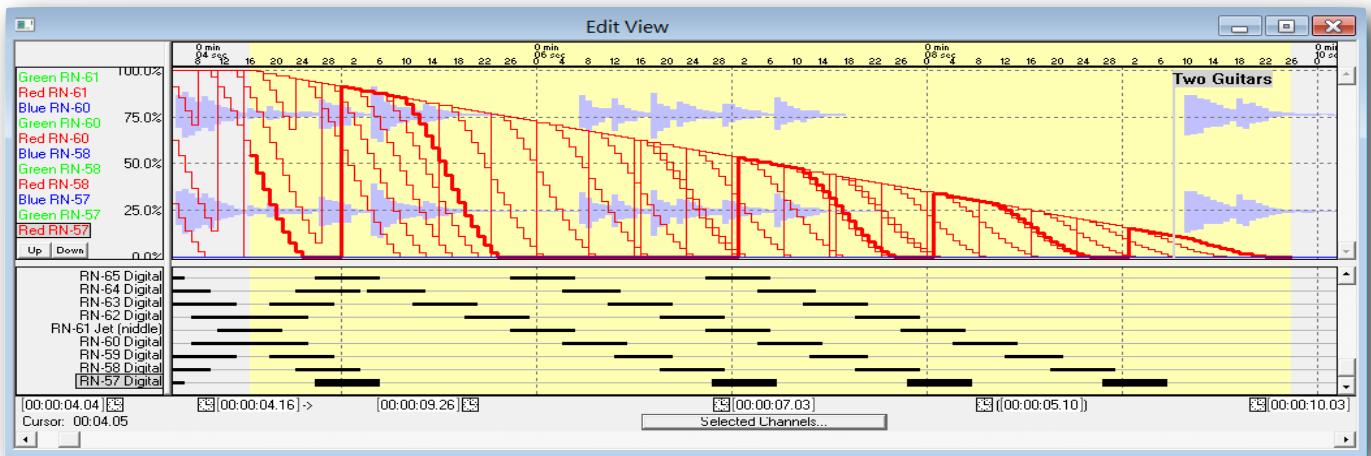
After: The selected analog channels have been scaled down by 50% through the five selected seconds. You can see that where the Red and Green channels are near their 'default' values of zero, there is barely any change in them. On the other hand, in the spots where they were near 100%, they have been scaled by the full 50% that was requested.

On the Blue channel, with its 'default' set to 50%, it is scaled by 50% symmetrically above and below the horizontal '50%' gridline:



The scaling works in both directions. If the scaling is set to values above 100% on the slider, the analogs will be scaled up instead of scaling them down:

If you uncheck the ‘Lock Sliders’ checkbox, you can set the beginning and ending values for scaling the selected area independently. This allows you to select and area of analogs, and ‘fade in’ or ‘fade out’ the analogs, even while they are performing a complex pattern of commands. Here the lighting channels are doing a chase. After scaling these channels are fading from a starting value of 100% to an ending value of 0% even as it is chasing:



If you want to fade in instead of a fade out, just click the ‘reverse values’ button.

The [‘Preferences’ menu’s ‘Cut/Paste Options’](#) are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

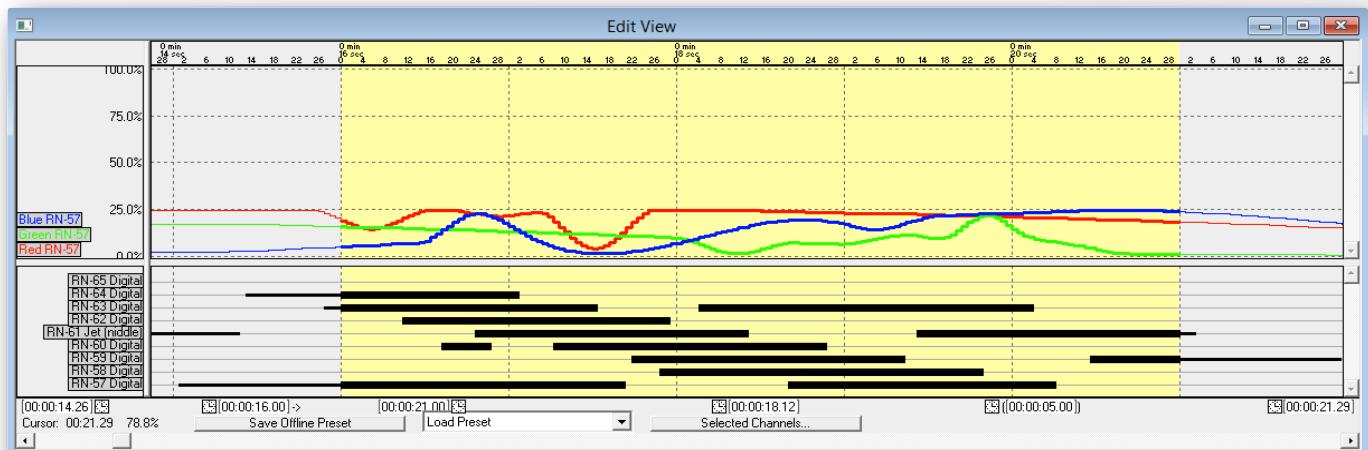
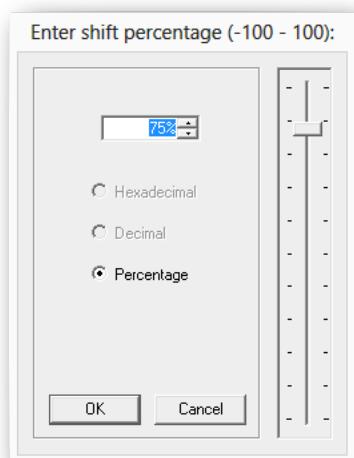
The selected digital channels are completely unaffected by this command.

## Shift by Percentage... (<Control>+5)

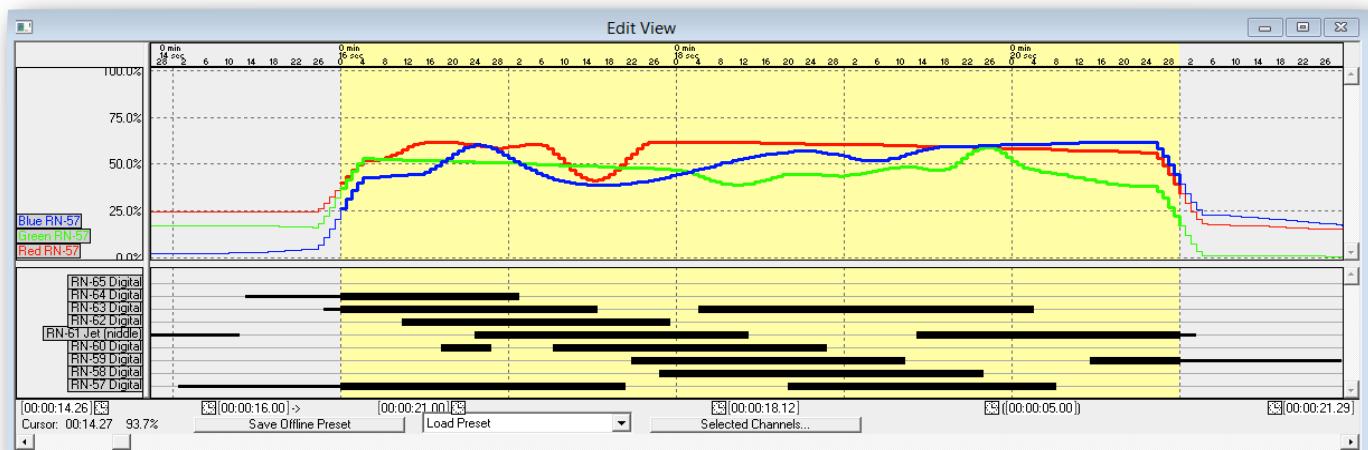
*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command is a numeric version of the ‘Shift’ rubberbanding command. It allows you to move any selected analog function(s) to a higher or lower level without altering the amplitude of the waveforms. Just enter a value for how far you want to shift the selected area.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The selected analog channels have been shifted upwards by 75% through the five selected seconds. The amplitude of the analog waveforms has not been altered. Just shifted:



The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

## Set Min and Max... (<Control>+6)

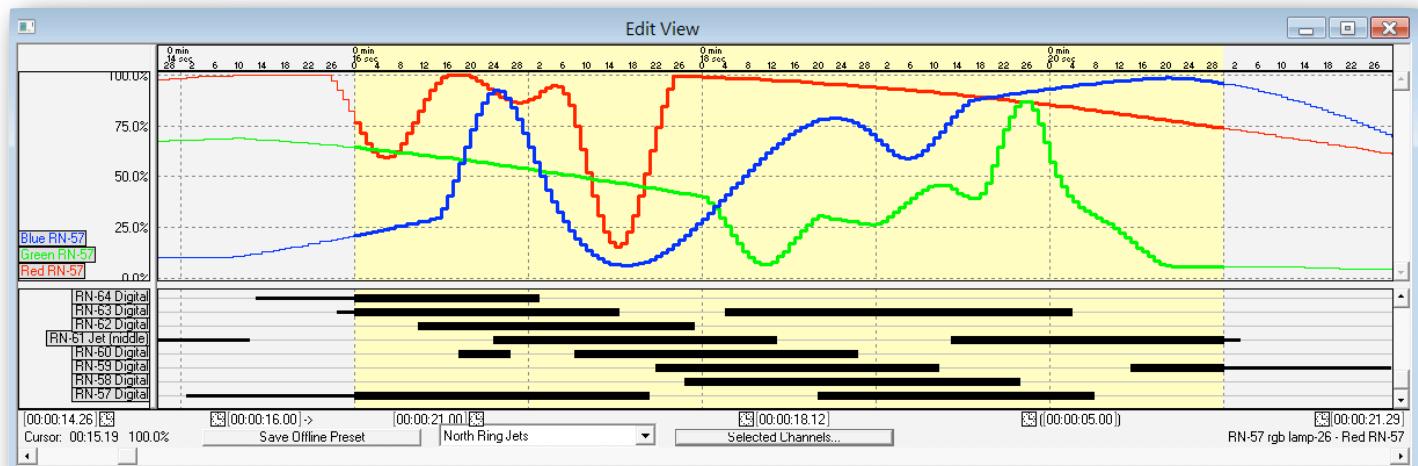
*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

When using GilderGear, the range of movement of analog movements are always set on the output device (DAC-Quad, Br-ANA, SER-DMX, etc.).

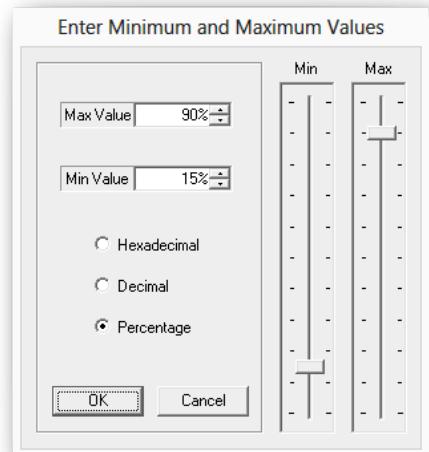
Strokes are normally adjusted with a stroke length that keeps the actuator from ever reaching the hard stops at each end of travel. The one exception to this is often on motion bases. During the motion base ‘flight’, the hard stops are never reached during any shows.

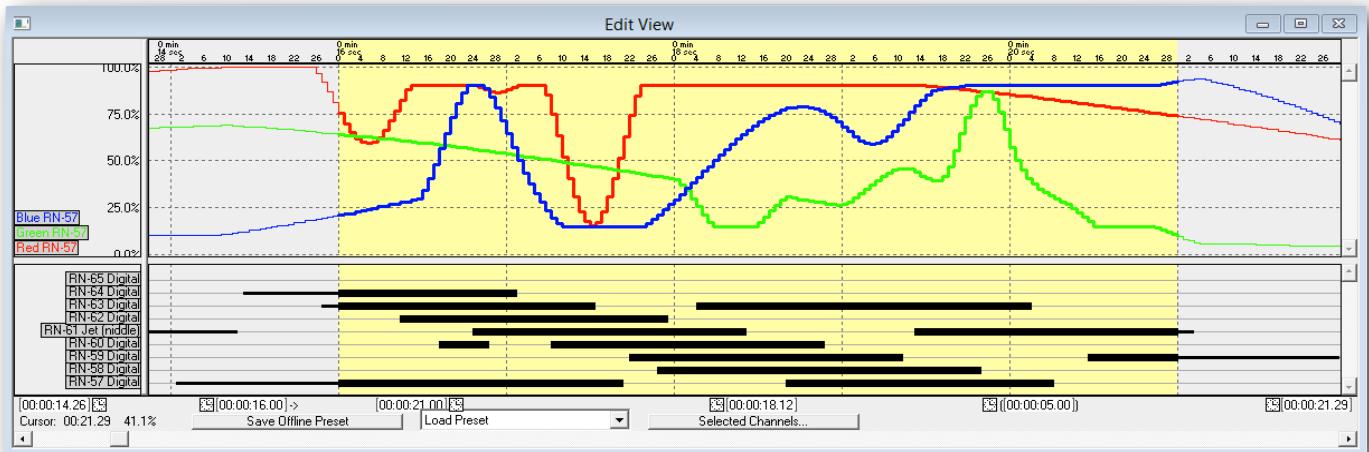
During the load and unload shows, it is normal to fly the base all the way into the hard stops on the actuators to eliminate any potential movement while people are stepping on and off the platform. After programming the motions, the bottom few percent can be trimmed off all the actuators’ waveforms to keep them from accidentally hitting the hard stops in all but the load/unload shows.

Before: A five second stretch of time containing both analog and digital channels has been selected:



After: The selected area, the analog channels have had the bottom 15% and top 10% trimmed off the waveforms:





The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc-MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

## Ramp Colors to a Value...

*This command is only available if one or more Red, Green and Blue analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

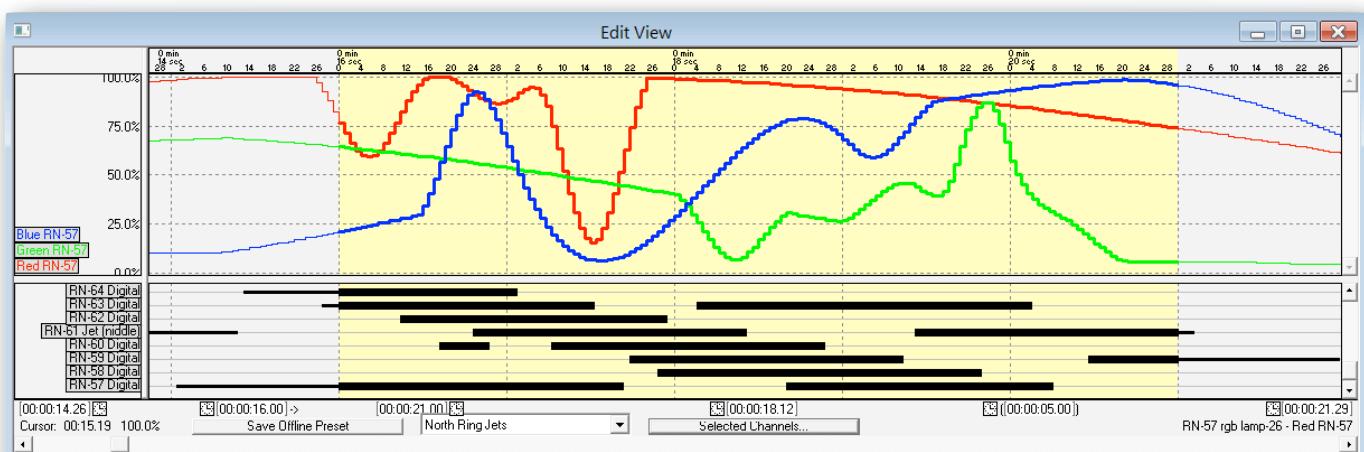
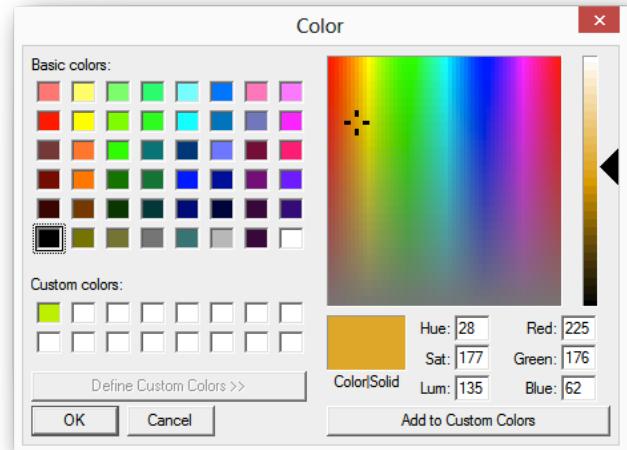
You can select a Ramp, Curve or Spline for the edit. This command then prompts you for an ending color for the selected analog channels.

Be sure to select the ‘brightness’ level using the slider at the right before selecting the color. If you don’t, the ending color will generally look a lot like black. Choosing from one of the ‘Basic Colors’ will automatically set the colors and the brightness.

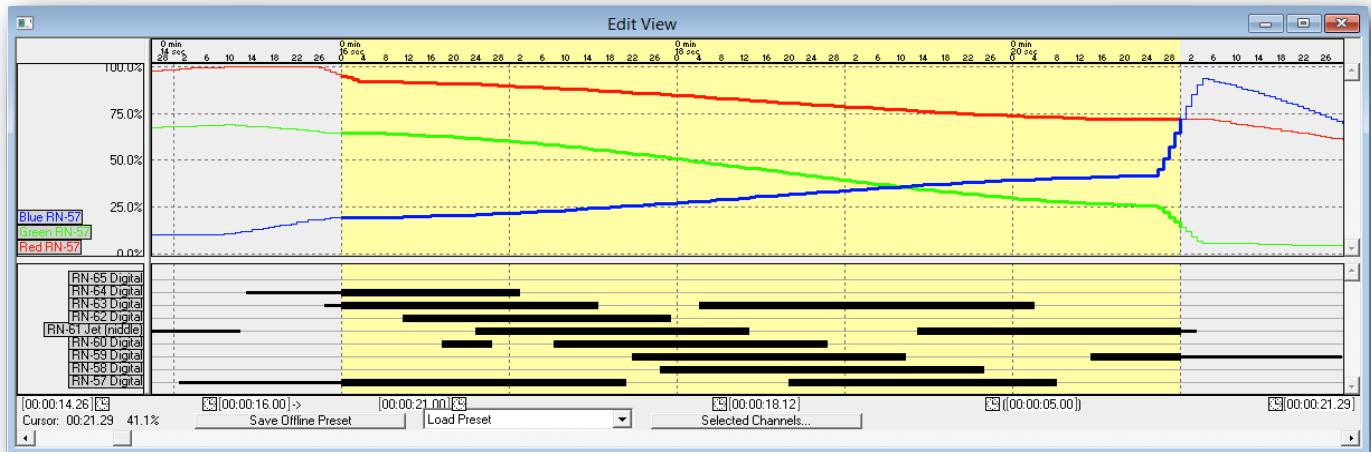
The ramp will be generated on these analog channels from whatever levels they are at the beginning of the selected area to the color value you have entered, which will be reached at the end of the selected area.

Be aware that many RGB light fixtures are not calibrated for color accuracy. Your lights’ colors may not match the color you selected. Once you find a color you like, you can save it by dragging it to the ‘Custom Colors’ grid.

Before: A five second stretch of time containing Red, Green and Blue analog lighting and digital channels has been selected:



After: The selected analog channels have been ramped to 75% through the five selected seconds using a ‘S-Curve’ for the ramp:



The '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, so Pc-MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

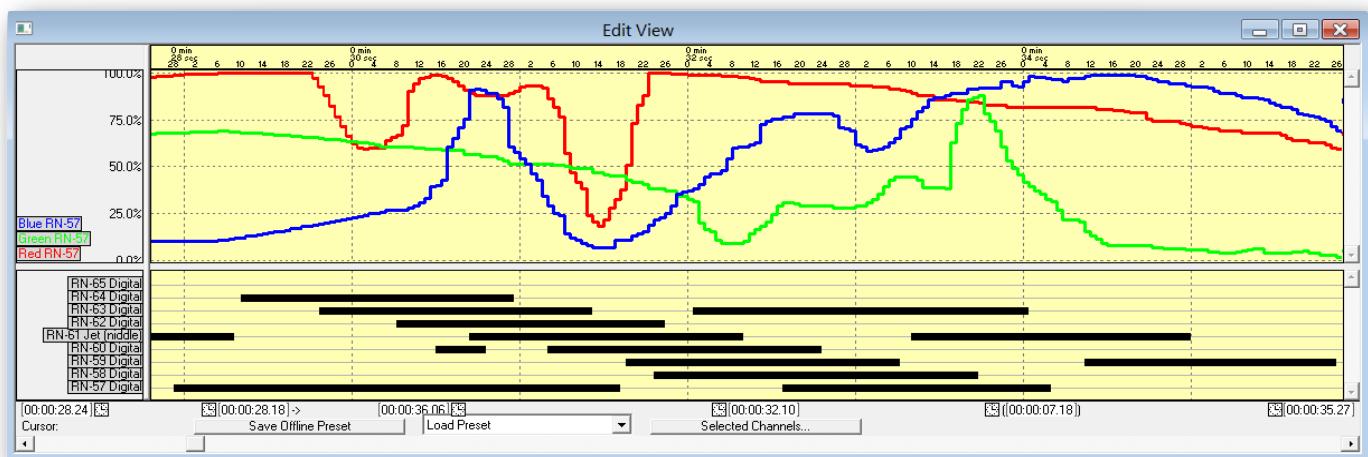
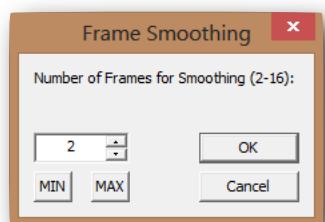
## Smooth ([F9])

*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

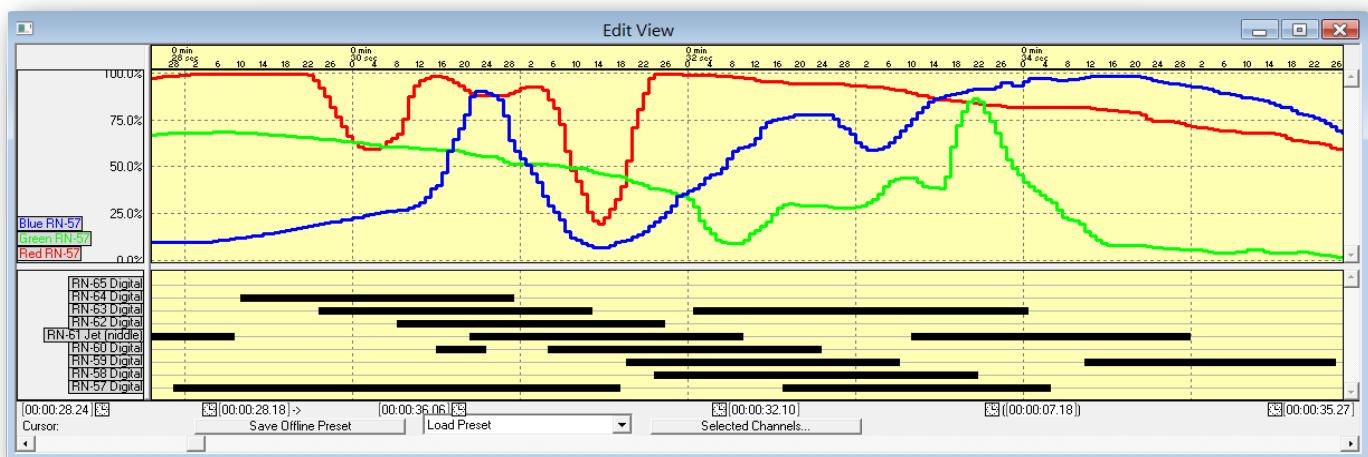
This command runs a simple filtering algorithm on the selected analog channels. This can be used to take any small variations out of analog channels that have been programmed in real time.

The filter averages the analog values in adjacent frames. The number of frames which are averaged is set on the '[Preferences](#)' menu's Smoothing dialog.

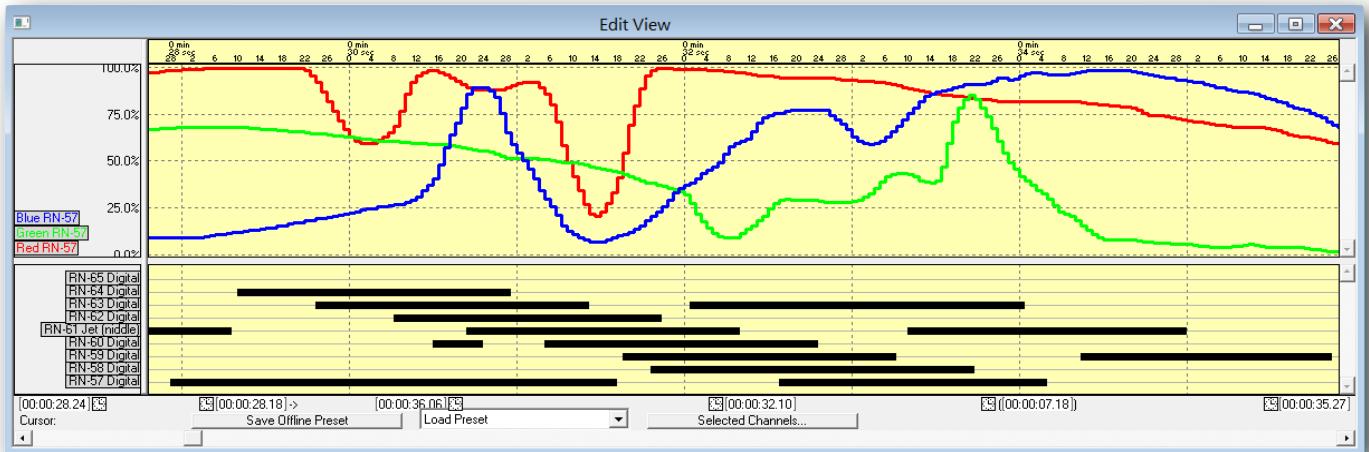
Before: A five second stretch of time containing both analog and digital channels has been selected. We purposely included some massive jaggies and discontinuities in the analog channels so you can see the results of the filtering:



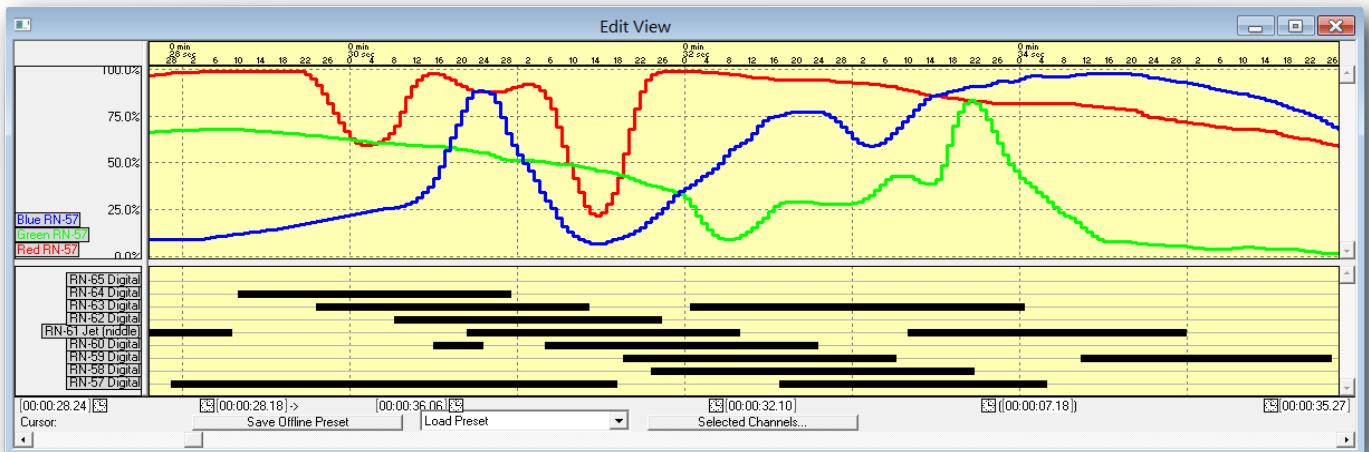
After x1: here after a single two frame 'smoothing' has been applied to the analogs:



After x2: here after two 2 frame ‘smoothing’ commands have been applied to the analogs. You can increase the filter value on the [‘Preferences’ menu’s](#) Smoothing dialog to get here in a single ‘Smooth’ command:



After x3: Here after three 2 frame ‘smoothing’ commands have been applied to this very noisy data. You can increase the filter value on the [‘Preferences’ menu’s](#) Smoothing dialog to get here in a single ‘Smooth’ command:



You can keep applying more smoothing to your analog channels or increasing the filter value on the [‘Preferences’ menu’s](#) Smoothing dialog, but eventually this will smooth the waveforms down to a series of flat lines.

The most common use of this command is to clean up the jaggies that are created by a programmer with an unsteady hand on the sliders, or when a low resolution gaming joystick is used for programming. Low cost gaming joysticks can have abysmal resolution. Gilderfluke & Co. joysticks and consoles have a very clean twelve bit resolution inputs, that don’t generally leave many jaggies in the show.

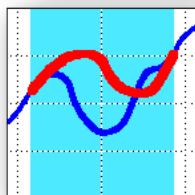
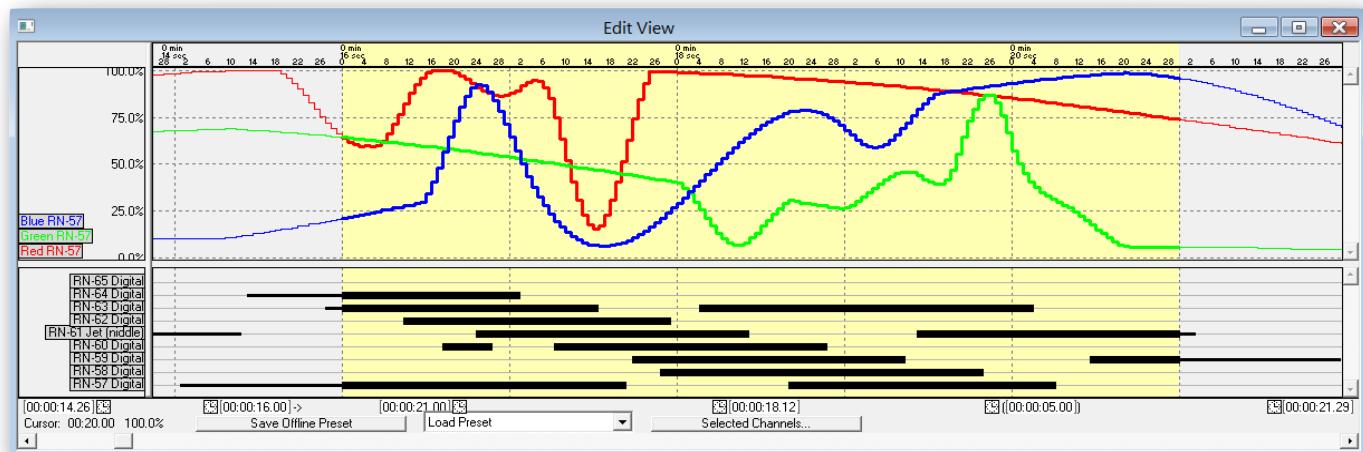
The selected digital channels are completely unaffected by this command.

## Inbetween ([F10])

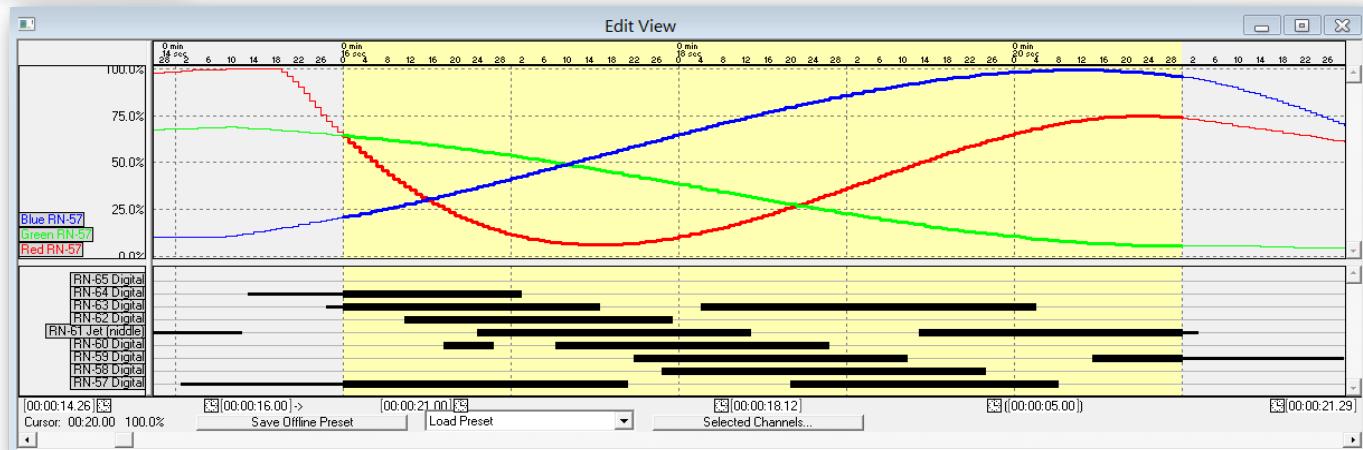
*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

The Inbetweening commands get both the starting and ending data for the ramps from the ends of the selected area on the OffLine Editing Window. It ‘straightens out’ each of the selected analogs across the selected area. The type of curve used is selected on the [‘Preferences’ menu’s Inbetweening dialog](#) or by using the [‘Edit’ Menu’s Setup & Inbetween](#) command.

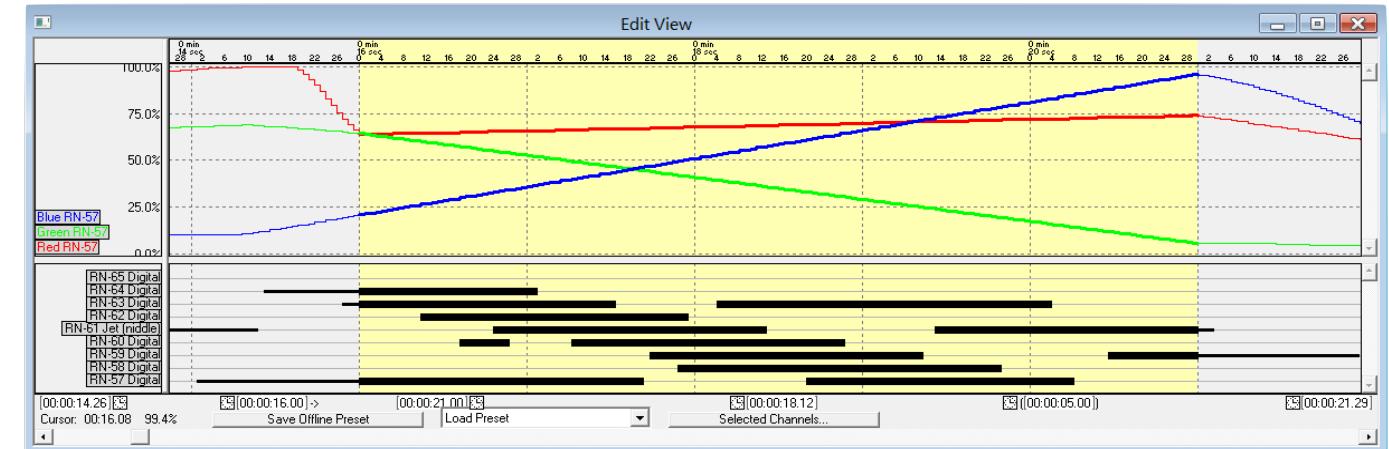
Before: A five second stretch of time containing both analog and digital channels has been selected:



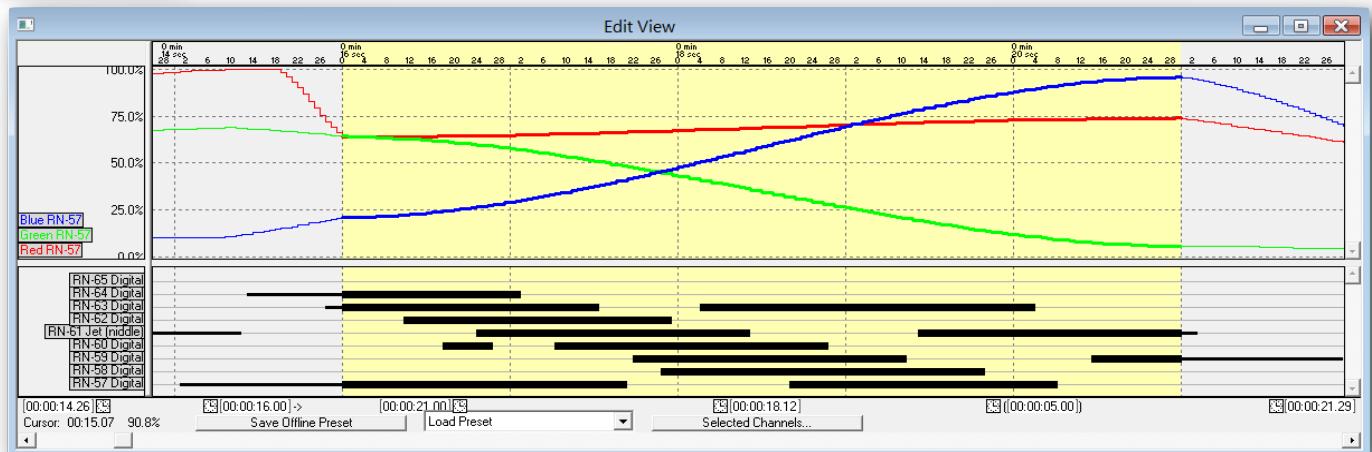
After #1: The two ends of the selected analog channels have been bridged using a ‘spline’ curve. Note that the ‘spline’ tries to match the data outside of the actual edit area:



After #2: The two ends of the selected analog channels have been bridged using a ‘linear’ curve. The ‘linear’ curve draws only straight lines between points. This tends to make whatever the system is controlling look somewhat ‘robotic’. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn’t give the movements the subtlety that it takes to make a show look like it is truly ‘alive’:



After #3: The two ends of the selected analog channels have been bridged using a ‘S-Curve’. This type of curve always starts and ends with zero velocity. It pays no attention to what is happening outside of the actual edit area the way a ‘spline’ does:



The [‘Preferences’ menu’s ‘Cut/Paste Options’](#) are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

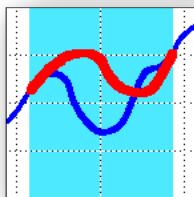
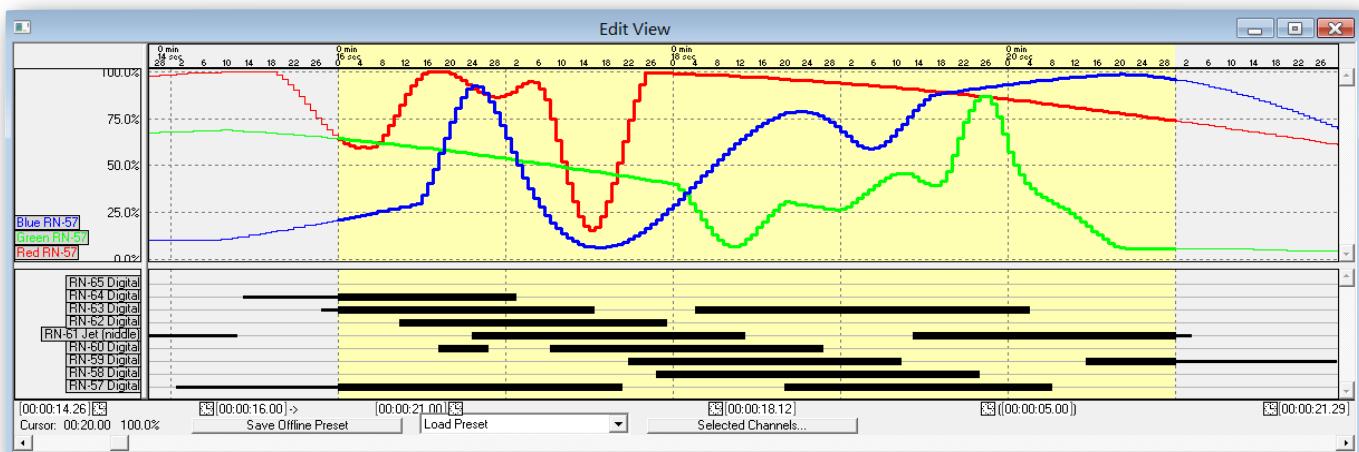
## Setup and Inbetween... (<Shift>+F10)

*This command is only available if one or more analog channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

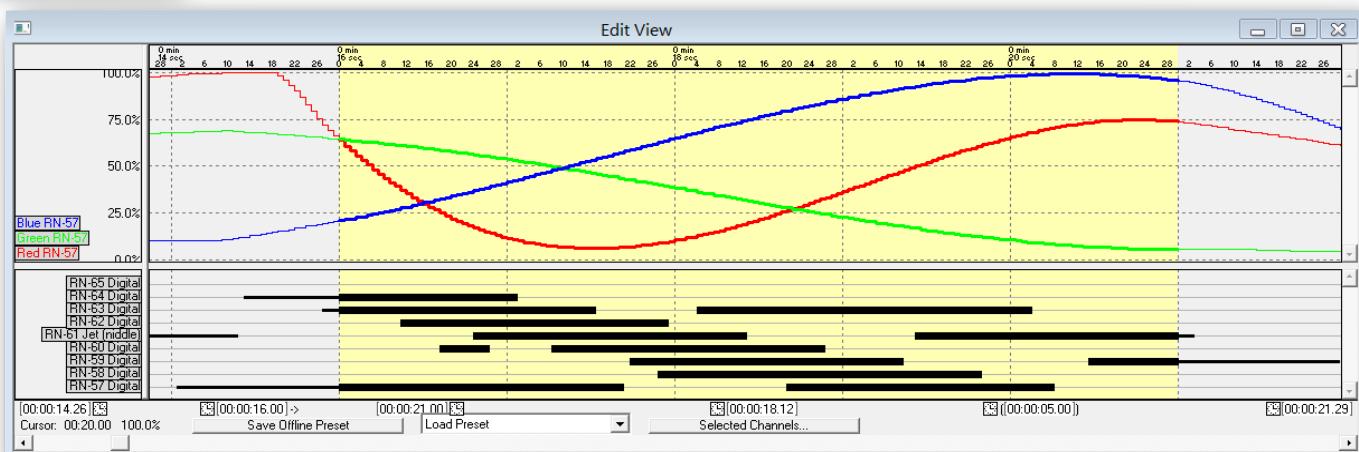
This command is identical to the regular ‘Inbetweening’ command, except that it gives you the option of setting which type of ‘curve’ is to be used before completing the command.

The Inbetweening commands get both the starting and ending data for the ramps from the ends of the selected area on the OffLine Editing Window. It ‘straightens out’ each of the selected analogs across the selected area.

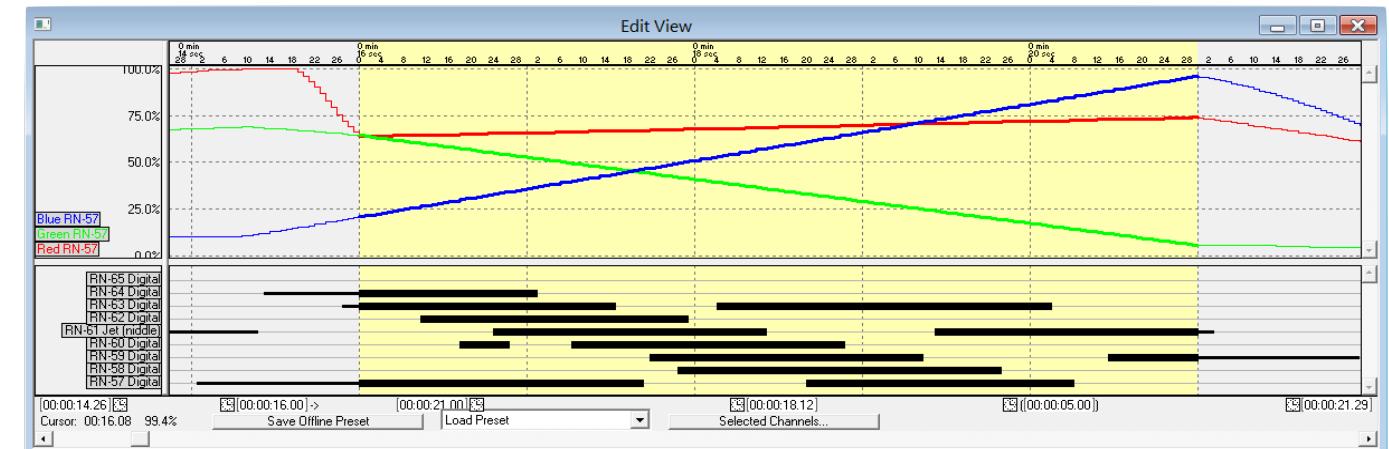
Before: A five second stretch of time containing both analog and digital channels has been selected:



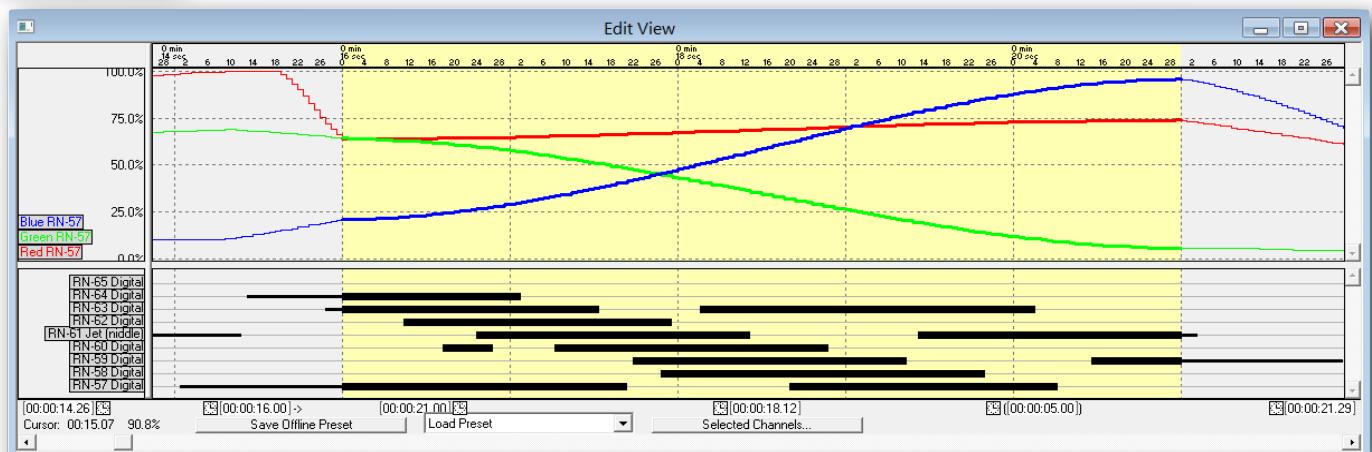
After #1: The two ends of the selected analog channels have been bridged using a ‘spline’ curve. Note that the ‘spline’ tries to match the data outside of the actual edit area:



After #2: The two ends of the selected analog channels have been bridged using a ‘linear’ curve. The ‘linear’ curve draws only straight lines between points. This tends to make whatever the system is controlling look somewhat ‘robotic’. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn’t give the movements the subtlety that it takes to make a show look like it is truly ‘alive’:



After #3: The two ends of the selected analog channels have been bridged using a ‘S-Curve’. This type of curve always starts and ends with zero velocity. It pays no attention to what is happening outside of the actual edit area the way a ‘spline’ does:



The [‘Preferences’ menu’s ‘Cut/Paste Options’](#) are enabled, so Pc•MACs automatically cleaned up any jumps this command might have made in the analog channels.

The selected digital channels are completely unaffected by this command.

## Select All (<Control>+A)

This command is used to select a bunch of stuff at the same time. If you are in any of the textually oriented entry boxes, all the text will be selected by this command. In the OffLine Editing Window, this command will select every channel on the screen. If there has been a non-zero range of time selected, then this command will select the channels only during this period. If a zero length range of time has been selected, then all the channels are selected for the entire length of the show.

## **Deselect All (<Alternate/Option>+A)**

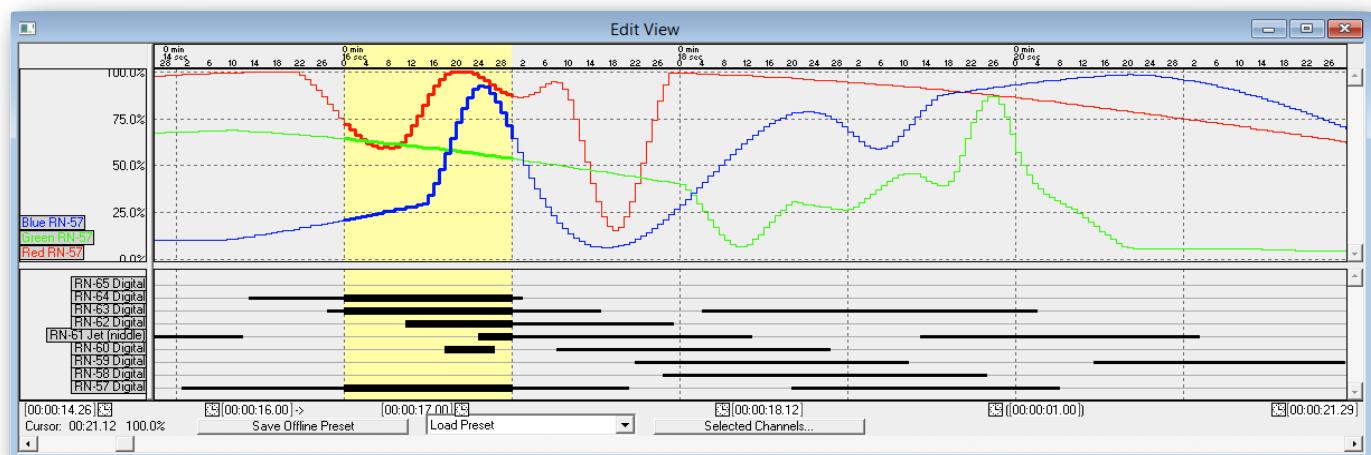
This command is used to deselect everything which is currently selected.

## Insert Time (<Control>+T)

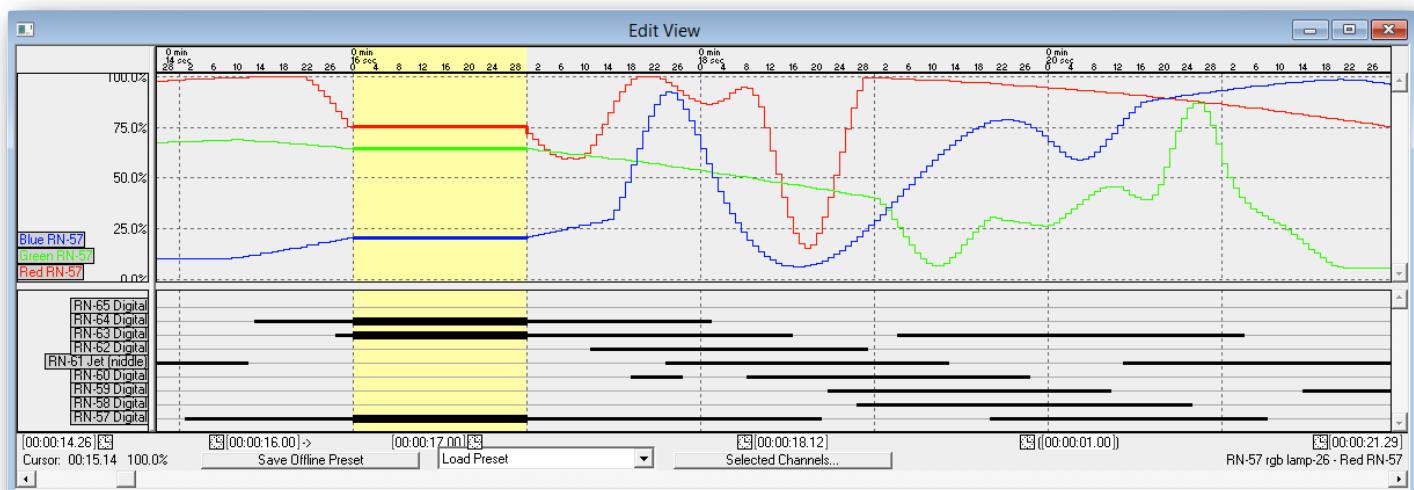
*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command is used to add time to one or more channels displayed on the OffLine Editing Window. It is used by selecting a range of time on one or more channels. When it is invoked, the amount of time selected will be inserted at the left edge of the selected area. Data on these channels at the end of the show may get shoved off the end of the show into limbo.

Before: A one second stretch of time containing both analog and digital channels has been selected:



After: The selected channels after the selected area has been shoved back in time by one second. The area which was created is filled with data duplicated from the



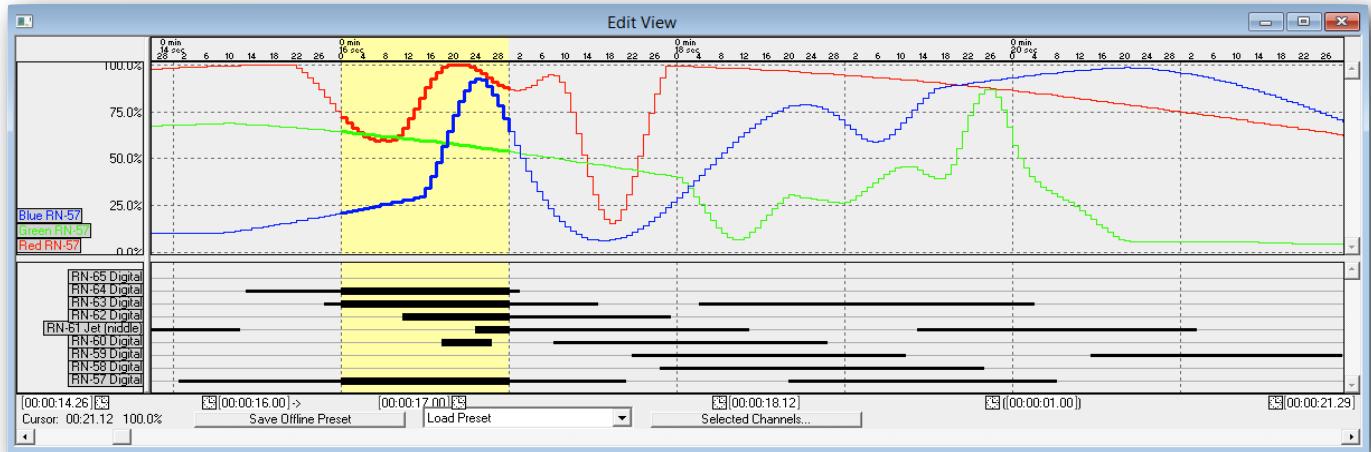
first frame of the selected area.

## Delete Time (<Alternate/Option>+T)

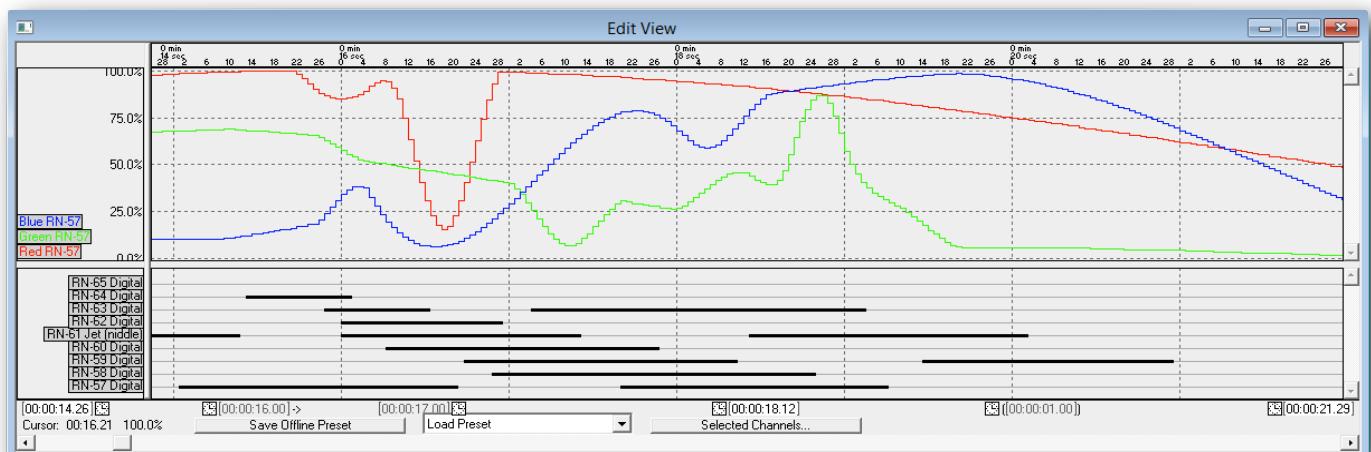
*This command is only available if analog and/or digital channels on the OffLine Editing Window have been selected for a non-zero stretch of time.*

This command is used to subtract time from one or more channels displayed on the OffLine Editing Window. When it is invoked, the selected channels will be deleted for the length of time selected. Data on these channels at the end of the show will be duplicated as needed as the data after the deleted time is slid forward in time to fill the void created.

Before: A one second stretch of time containing both analog and digital channels has been selected:



After: The selected channels after the selected area has been shoved forward in time by one second. If the '[Preferences](#)' menu's '[Cut/Paste Options](#)' are enabled, Pc•MACs will automatically clean up any jumps this command might have made in



the analog channel.

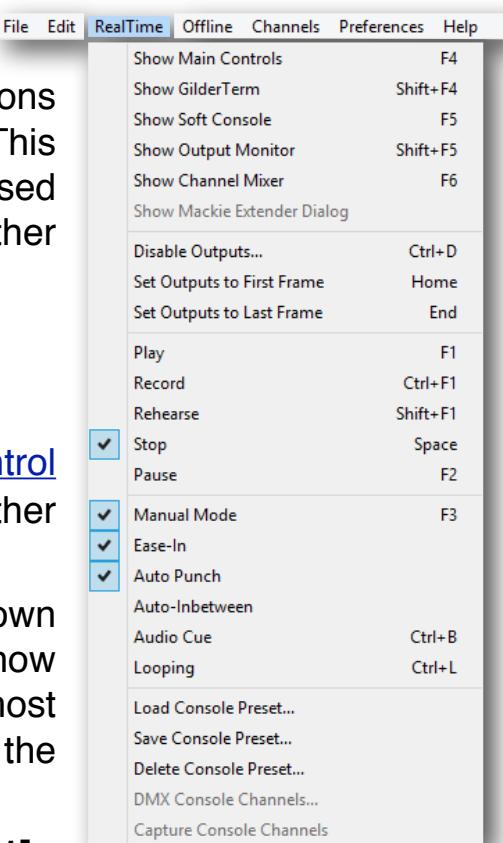
# 'RealTime' Menu

This Menu is where all the commands having to do with the real time programming of a show can be found. Most of the commands are duplicates of the buttons and checkboxes found on the Show Transport Window. This pulldown and its command key equivalents can be used when the Show Transport Window is covered by another window.

## Show Main Control Window [F4]

This command is used to bring the [Main Control Window](#) to the front when it has been covered by another window.

At the top of the Pc•MACs window are all the pulldown menus. In the center of the screen is the 'Show Transport' screen with large Buttons for all the most commonly used commands in Pc•MACs. Buttons on the Main 'Control' Window are:



### Play Button [F1]

This command is also available from the ['Realtime' menu](#) or by hitting the [F1] function key on your keyboard. It can also be assigned to a Soft Console Button. It will start whatever show is currently loaded playing. Any assigned inputs will be displayed on the programming console as well as being sent to the outputs. There is no way for data to be altered when in 'Playback' mode.



If the show is Smpte time code locked, Play will also start Pc•MACs listening for time code to lock on to. If it is a DVD/LaserDisk show, then the serial commands you have entered for the DVD/LaserDisk Start String (set up on ['File' menu's Show Info dialog](#)) will be sent out through the DVD/LaserDisk port.

Show playback starts at wherever the 'Start Time' slider has been set. Internally, Externally, DVD/LaserDisk and AudioFile/VideoFile shows will simply start at whatever the 'Start' time is set to. Smpte shows, being at the mercy of the tape position, will start listening for time code but won't start updating the outputs until the 'Start' time has passed.

Show playback normally continues until the time set on the 'Stop Time' slider.

If the Looping Mode has been switched 'On', the show will continuously play back from the 'Start Time' slider to the 'Stop Time'. Pc•MACs can be stopped by either clicking 'Off' the Looping Mode (so that the show finishes the current loop and then stops normally), or by giving it a Stop command.

Pc•MACs can be taken out of 'Record' or 'Rehearsal' modes at any time by simply hitting this command. If the Auto-Inbetween function is on when going from 'Record' to 'Play' modes, then any jumps that might have been created in any analog channels will be automatically smoothed out.

### **Record Button (<Control>+[F1])**

This command is also available from the '[Realtime' menu](#) or by hitting the <Control>+[F1] key on your keyboard, and can also be assigned to a Soft Console Button. It will start whatever show is currently loaded playing back in 'Record' mode. Any inputs that are assigned on the console will be recorded into the channels they are assigned to. Data from any inputs which are assigned, but have been 'punched out' on the console ('Punched Out' checkbox checked), will not be altered. All other channels that have previously had data programmed into them will be played back and won't be altered.

Pc•MACs can be taken out of 'Play' or 'Rehearsal' modes at any time by simply hitting this command. If the Auto-Inbetween function is on when going from 'Play' to 'Record' modes, then any jumps which might have been created in any analog channels will be automatically smoothed out.

### **Rehearsal Button (<shift>+[F1])**

This command is also available from the '[Realtime' menu](#) or by hitting the <shift>+[F1] key on your keyboard, and can also be assigned to a Soft Console Button. It works in every way exactly like the 'Record' mode, except that no data is written to the show.

Pc•MACs can be taken out of 'Play' or 'Record' modes at any time by simply hitting this command.

## Stop Button (<space bar>)

This command is also available from the '[Realtime](#)' menu or by hitting the <space bar> on your keyboard, and can also be assigned to a Soft Console Button. It immediately stops any 'Play', 'Record', or 'Rehearsal' that is in progress.

If the Auto-Inbetween function is on when going from 'Record' mode, then any jumps which might have been created in any analog channels will be automatically smoothed out.

## Pause/Continue Button ([F2] or <Shift>+<Space Bar>)

It immediately stops any 'Play', 'Record', or 'Rehearsal' that is in progress and changes to a 'Continue' button. This can also be assigned to a Soft Console Button. If 'Manual' mode is, on, then manual control over the animated show will be returned to the programming console (after an EaseIn, if this option is active). If the 'Continue', 'Play', 'Record', or 'Rehearsal' button is pressed, then the show will continue 'Playing'/'Recording'/'Rehearsing' from the frame where it was paused.

## OffLine Button ([F8])

This command is also available from the '[Realtime](#)' menu or by hitting the [F8] key on your keyboard. If Pc•MACs is stopped, it will simply open the OffLine Editing Window. If it is in any 'Play', 'Record', or 'Rehearsal' mode, it will immediately stop all playback and jump into the OffLine Editing Window in single step mode with the center time set to the instant where you hit the command. This is a useful shortcut to help you in hunting down any glitches in your show.

The Current Show Time and a 'gas gauge' of how far into the show Pc•MACs is are on the Main Control Window. Because the screen update is handled as a lower priority task by Pc•MACs, this display will often be a frame or two behind the actual show time. If you want to see this get horribly behind, just move one of the sliders on the screen while a show is running.

The Console Preset Popup can be used to select any Console Presets you have previously saved. This will immediately reconfigure the console to whatever condition it was in when you saved the requested preset. When entering the program, Pc•MACs won't know the current condition of the console, and so will display a blank or 'current' initially. When a show is loaded, the last Console Preset that was used will be displayed.

The Skew Function is used during 'Record' mode to offset the animation data as it is recorded. If the Skew is set to anything other than zero frames, all animation data stored during a Record will be shifted 'forward' in time by the number of frames you have entered. This lets you allow for the delay in your reaction time and the time it

takes for the figure you are programming to respond to commands. This means that during any playback when the skew is set back to zero, these movements will be commanded to move just a hair sooner than they were during the Record.

The following Main ‘Control’ Window Checkboxes are available. Each of these are also available from the [‘Realtime’ menu](#) and command key equivalents. They are used as follows:

### Auto Punch CheckBox:

When 'On', this toggle tells Pc•MACs to check the 'Punch In' and 'Punch out' sliders on the Show Transport Window when starting a 'Record' or 'Rehearsal'. If enabled, Pc•MACs will stay in 'Play' mode until the 'Punch In' time is reached. It will then go into 'Record' or 'Rehearsal' mode, as requested. It will stay in this mode until the 'Punch Out' time has passed or the 'Stop' time is reached. Pc•MACs will then return to 'Play' mode. This checkbox will turn itself 'On' if you move the 'Punch In' and 'Punch out' sliders to anywhere but the start/end of the show.

### Manual Mode CheckBox [F3]

When Pc•MACs is idle, the 'Manual' mode can be used to send data from any assigned inputs on the programming console to the outputs. This allows you to move figures for testing and to get the feel of them before you start recording a show.

### EaseIn CheckBox

This toggle tells Pc•MACs to try to keep analog movements from moving too quickly when you give Pc•MACs any command that might otherwise cause them to jump. A radio button just to the right of the EaseIn toggle shows when any EaseIns to show that it is working. The length of the crossfade that Pc•MACs generates during EaseIns is set in 10ths of seconds on the [‘Preferences’ menu’s EaseIn dialog](#).



### Audio Cue CheckBox (<Control>+B)

This is a convenience feature that allows you to set a show time when the PC will beep at you. This allows you to set an audible cue when there is nothing in the show’s sound track to warn you of an impending event. The time is set using the slider on the Show Transport Window. This toggle is used to turn it 'On' and 'Off'. It is automatically turned 'On' whenever the Audio Cue Time Slider is moved to anywhere but the very beginning of the show (this turns it off).

### Looping CheckBox (<Control>+L)

This toggle tells Pc•MACs that you would like it to immediately start playing the show over again at its end. This poses no problems for Internally, Externally,

DVD/LaserDisk or AudioFile/VideoFile shows. Smpte shows, again are at the mercy of the timecode received

## Auto-Inbetween CheckBox

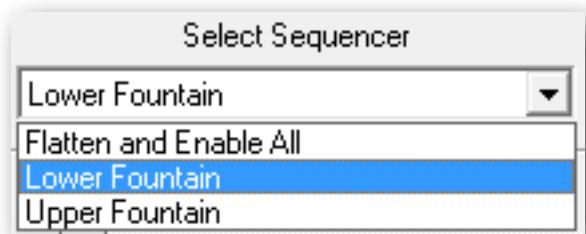
This function is used to automatically remove the jumps in the analog animation data that might be created when you punch in or out an analog channel. This feature will remember the exact point in time where you made up to 250 punches on any single Record pass. Pc•MACs remembers:

- a) When you punch in/out a single analog from the Pc•MACs Programming Console's Blue 'Assignment' buttons.
- b) When you punch in/out all the analogs using the Auto Punch feature.
- c) When you punch in and out by hitting the 'Play', 'Record' or 'Rehearsal' Buttons.
- d) Or even when you just press 'Stop' to bail out of the 'Record' mode.

The options for this feature are set on the '[Preferences](#)' menu's Auto-Inbetweening dialog. These include the type of curves that will be used to remove the jump, how far before and after the punch points you would like the curve to extend, and whether or not you would like Pc•MACs to ask you before it automatically removes any jumps <sup>16</sup>.

## Select Sequencer

If programming multi-Sequencer shows, this drop-down is used to select which sequencer is active for programming. In this example, there are two sequencers, 'Lower Fountain' and 'Upper Fountain'. When a specific sequencer is selected, all the channels used by the other sequencers are removed from the mover dialogs, OffLine Editing Window, and Soft Console. This is to keep you from accidentally programming a channel that is not active in the selected sequencer, and potentially screwing up a channel that is active in another Sequencer.



For those occasions when you do need to access channels that are in other sequencers, you can select the 'Flatten and Enable All' option. This temporarily turns off the multi-Sequencer features in Pc•MACs, and you can access any channel in the [Channels List](#), just as if this was single sequencer show. This is used primarily for programming shows that run on the 'first'/'main' sequencer in [PopOut](#) show projects.

16 This is only rarely used....

The Br-Brain4 is the only piece of GilderGear that currently supports multiple Sequencers in a single AutoDownload file.

### **Load Preset (Shift to Save)**

This drop-down is used to load console presets. If more than one programming console is enabled on the '[Preferences](#)' menu's '[Consoles](#)' dialog, then it will ask which console you want to load the preset onto.

If you press this while holding the <Shift> key down on your keyboard, you can save the current console settings as a new preset.

### **Skew**

This numeric value is used to 'skew' the timecode used for playing, recording and rehearsing shows.

This is typically used when you are recording show data 'live' into Pc•MACs. Whatever you do on the programming console input will be recorded into the show leading the timecode by the number you enter here. This allows you to compensate for your reaction time and other delays automatically as you program your show in RealTIme.

Be sure to set this value back to zero before you revue your show for timing accuracy. If you don't, you will be looking at a 'skewed' version of the show.

### **Main Control Window Sliders**

At the center of the Main Control Window (and taking up most of the space) are five large Main Control Window 'Sliders'. These times can be modified by scrolling the 'sliders' or you can select any of the adjacent time values and change the time by:

- a) clicking on the left mouse button increments a value
- b) clicking on the right mouse button decrements a value
- c) sliding the mouse upwards increments the value
- d) sliding the mouse downwards decrements the value
- e) entering in the value using the numeric keys on your keyboard
- f) clicking on the small clock face next to each time brings up a popup window. These allow you to copy a time from another source or paste this time or from this time into another destination.

The Main 'Control' Window Sliders are used as follows:

## 1) Start Time Slider

This sets the offset into shows where show will start when the 'Play', 'Record' or 'Rehearsal' commands are invoked. Smpte synchronized shows are at the mercy of the time code they receive. They won't start updating the outputs until the time code passes the point you have selected. When the Looping checkbox has been selected, this point is also used as the beginning on each iteration of the loop.

## 2) Stop Time Slider

This sets where in the show Pc•MACs will stop playing. It is normally set to the end of the show, but can be set at any point after the 'Start Time' slider. This is especially useful when looping. A short section of a show can be selected using this and the Start Time slider and repeated as many times as needed.

## 3) Punch In Time Slider

This slider effects Pc•MACs only when it is in either the 'Record' or 'Rehearsal' modes. It is used to automatically put all of its assigned inputs into 'Record' mode at a preset time. The 'Record' or 'Rehearsal' button on the main screen will flash until this time has been reached. Pc•MACs will then beep and enter the appropriate mode. Inputs that will be recorded must have been previously assigned on the programming console, and can not have been punched out locally on the console. The slider can be set to any point in the show. If the show starts any time after the selected time, Pc•MACs will interpret this as having passed this point and go immediately into 'Record'. The automatic punch in and out can be disabled by clicking 'Off' the Auto-Punch checkbox. Note that moving either the Punch In or Punch Out Time Sliders will automatically set the AutoPunch checkbox.

If it is enabled, the Auto-Inbetween function will smooth out any jumps in any analogs which are active at the automatic punch times.

## 4) Punch Out Time Slider

This slider serves the complementary function to the Punch In Time Slider. When the time selected on this slider has passed, Pc•MACs will beep and return to 'Play' mode from either 'Record' or 'Rehearsal' modes. The slider can be set to any point in the show. If the show starts any time after the selected time, Pc•MACs will interpret this as having passed this point and go immediately into 'Play'. The automatic punch in and out can be disabled by clicking 'Off' the Auto-Punch checkbox. Note that moving either the Punch In Time or Punch Out Time Sliders will automatically set the Auto-Punch checkbox.

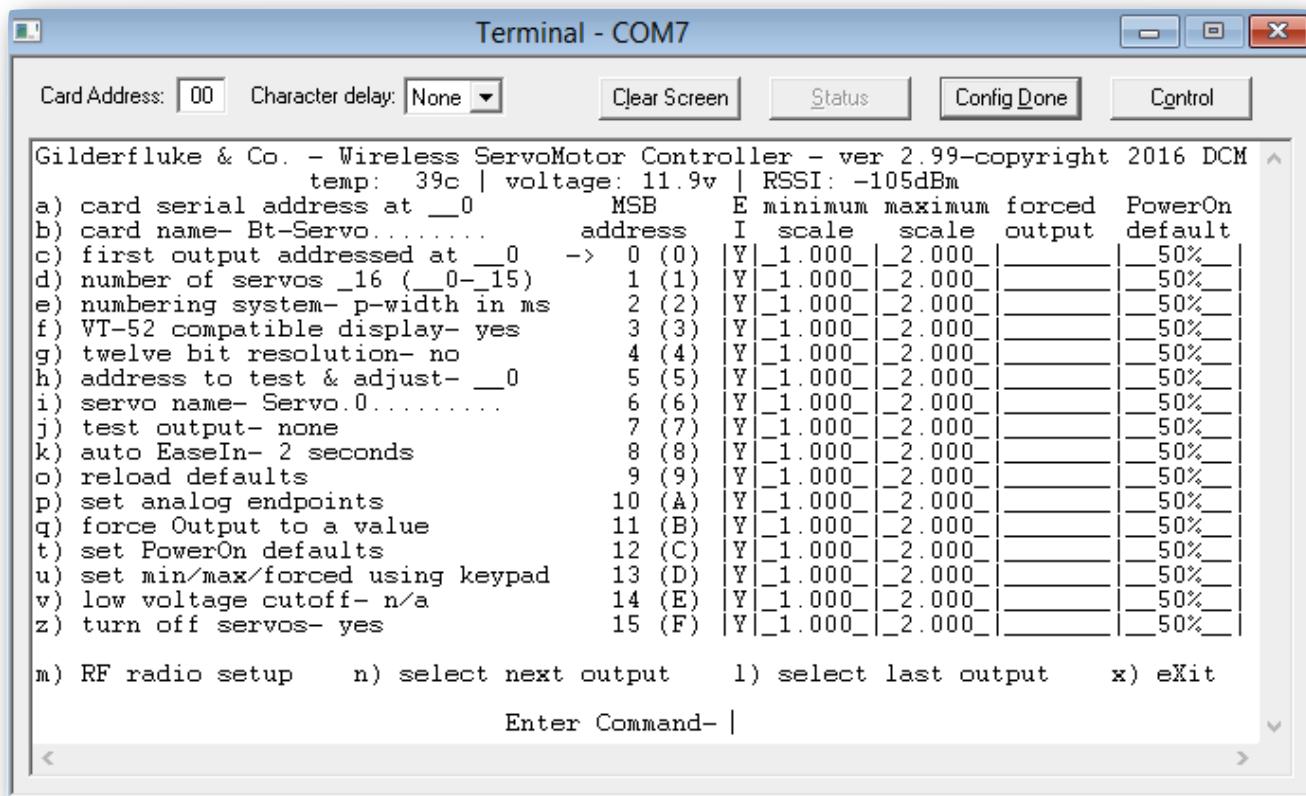
If it is enabled, the Auto-Inbetween function will smooth out any jumps in any analogs that are active at the automatic punch times

## 5) **Audio Cue Time Slider**

This is a convenience feature of Pc•MACs which tells it to beep at the time you have selected. It is used when you are programming a function that doesn't give you sufficient warning that it is about to happen. The audio cue can be disabled by clicking 'Off' the Audio Cue checkbox or setting it to the very beginning of the show. Moving this slider to anywhere other than the very beginning of the show will automatically set the Audio Cue checkbox.

## Show/Hide GilderTerm (<shift>+4)

GilderTerm is a simple serial terminal program. It is built into Pc•MACs, and is also available as a stand-alone program. It is typically used when configuring or diagnosing problems on various pieces of GilderGear. If you contact our tech support staff with a question about the configuration of a piece of GilderGear, you will often be asked to plug in a serial port and run GilderTerm so that you can be the remote eyes and ears for our tech staff.



If GilderTerm and Pc•MACs are using the same serial port, opening GilderTerm will temporarily disable the serial updates that Pc•MACs normally sends to the target control system through the serial port. You cannot simultaneously share a serial port between two different programs. The text shown on the sample image of GilderTerm is the menu from the particular piece of GilderGear. Unless you are configuring a Bt-Servo, your text will be different from what is shown.

There are six controls located at the top of the GilderTerm window. They are used as follows:

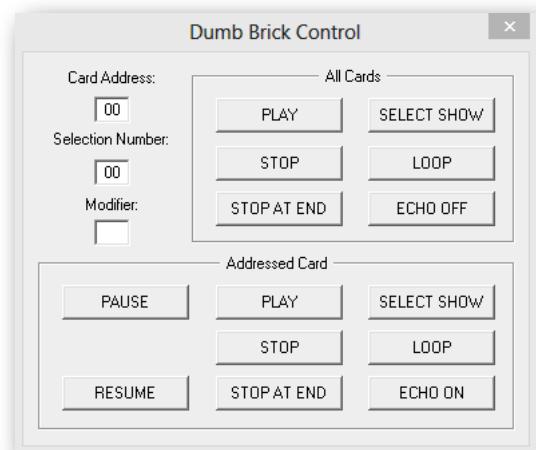
- a) **Card Address:** This is the serial address used to access a given piece of GilderGear. It is appended to the end of the commands that are sent to the

GilderGear to get a status report or enter the configuration mode. The address is a two digit hexadecimal number.

- b) **Character Delay:** This is a legacy item that can be used to slow down the transmission of ascii characters from GilderTerm to the GilderGear it is talking to. In the early days of Windows PCs, they couldn't keep up with 9600 baud, without dropping characters. This drop-down was used to slow the data rate down.
- c) **Clear Screen:** This simply clears whatever is on the terminal window.
- d) **Status:** This sends a 'status' request to the attached GilderGear. The serial address is appended to the command, so that only one card will respond if it is in a networked installation. If no card responds, then there is nothing at the selected serial address. You can use the 'find Cards' command to locate your GilderGear on the network. If a card does respond, it will spit out a status report to the terminal window. This button is unavailable if the GilderGear is in configuration mode.
- e) **Configure/Config Done:** This button is used to tell the attached GilderGear to enter configuration mode. The serial address is appended to the command, so that only one card will respond if it is in a networked installation. If no card responds, then there is nothing at the selected serial address. You can use the 'find Cards' command to locate your GilderGear on the network. If a card does respond, it will spit out its internal menu to the terminal window.

You should always exit configuration mode (either by hitting the 'Config Done' button, or typing an 'X' followed by a 'Y' or 'N') before exiting GilderTerm.

- f) **Control:** This button opens a small widow that allows you to send standard serial GilderCommands to the GilderGear that is attached to the serial port:
  - i) **Card Address:** This is the serial addressed used to access a given piece of GilderGear. It is appended to the end of the commands that are sent to the GilderGear to get a status report or enter the configuration mode. The address is a two digit hexadecimal number.
  - ii) **Selection Number:** This the track you are going to select using either of the 'Select Show. buttons. The selection is a two digit hexadecimal number.



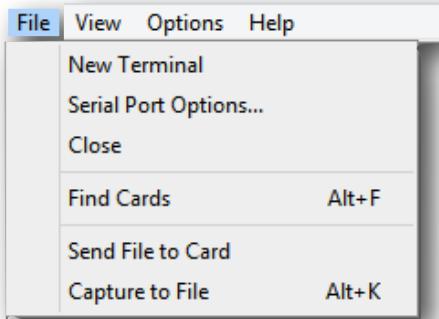
- iii) **Modifier:** This is a single ASCII character that is appended onto the end of the commands GilderTerm sends out. It is normally used for sending the characters ‘a’ through ‘h’ to select the sequencer number in a Br-Brain4.
- iv) **All Cards/Play:** Sends an ascii ‘u’ to start all the GilderGear that is listening to the serial network. At the end of the show, the GilderGear will stop and wait for the next command.
- v) **All Cards>Select Show:** Sends an ascii ‘\*’, followed by the Selection Number (in hex) to select the show to play on next start/loop command.
- vi) **All Cards/Stop:** Sends an ascii ‘y’ to stop all the GilderGear that is listening to the serial network.
- vii) **All Cards/Loop:** Sends an ascii ““ to start all the GilderGear that is listening to the serial network. At the end of the show, the GilderGear will check to see if it should play another show.
- viii) **All Cards/Stop at End:** Sends an ascii ‘&’ to stop all the GilderGear that is listening to the serial network at the end of the current show.
- ix) **All Cards/Echo Off:** Sends an ascii ‘b’ to turn off Echo Mode. Commands will no longer be echoed to the terminal widow in human readable strings.
- x) **Addressed Card/Pause:** Sends an ascii ‘<, followed by the Card Address (in Hex) to pause playback on the addressed card.
- xi) **Addressed Card/Play:** Sends an ascii ‘t’, followed by the Card Address (in Hex) to start all the GilderGear that is listening to the serial network. At the end of the show, the GilderGear will stop and wait for the next command.
- xii) **Addressed Card>Select Show:** Sends an ascii ‘\*’, followed by the Card Address (in Hex), followed by the Selection Number (in hex) to select the show to play on next start/loop command.
- xiii) **Addressed Card/Stop:** Sends an ascii ‘y’, followed by the Card Address (in Hex) to stop all the GilderGear that is listening to the serial network.
- xiv) **Addressed Card/Loop:** Sends an ascii ““, followed by the Card Address (in Hex) to start all the GilderGear that is listening to the serial network. At the end of the show, the GilderGear will check to see if it should play another show.
- xv) **Addressed Card/Resume:** Sends an ascii ‘>, followed by the Card Address (in Hex) to un-pause playback on the addressed card.

xvi) **Addressed Card/Stop at End:** Sends an ascii ‘&’, followed by the Card Address (in Hex) to stop all the GilderGear that is listening to the serial network at the end of the current show.

xvii) **Addressed Card/Echo On:** Sends an ascii ‘b’, followed by the Card Address (in Hex) to turn On Echo Mode. Once turned On, serial commands will be echoed to the terminal widow in human readable strings.

When running GilderTerm in either the Pc•MACs or standalone version, simplified GilderTerm menus will replace the normal Pc•MACs menus. These reduce the selections available to those only having to do with GilderTerm.

### 1) New Terminal



You can open multiple instances of GilderTerm, as long as each instance has a COM port available to it. This works particularly well with bluetooth connected serial ports, where one Bluetooth transmitter can handle seven independent COM port connections.

### 2) Serial Port Options

This is where you select the serial port to use with GilderTerm. If you have a USB-to-Serial adapter plugged into your PC, but it doesn't appear in the list of available COM ports, check the Windows Device Manager to see if the serial port is operating properly.

### 3) Close

This closes the GilderTerm window and returns Pc•MACs to normal operation.

### 4) Find Cards

This command sends queries to all 256 possible serial addresses and reports any GilderGear that is found.

### 5) Send File to Card

Use this command to send an existing AutoDownload files or configuration files through the serial port to a piece of GilderGear. Whenever you do an AutoDownload, Pc•MACs saves the AutoDownload file (extension = .A00). Just sending this file to a piece of GilderGear will tell it to accept and save this file. If you have the same AutoDownload file going onto several pieces of GilderGear, this is a quicker way to distribute them than generating new AutoDownload files from the [‘File’ menu’s AutoDownload dialog](#).

If you have a remote client who somehow erases their shows, or if your are distributing new shows to a remote client, you can email them the AutoDownload file to send to the controller using only GilderTerm.

## 6) Capture to File

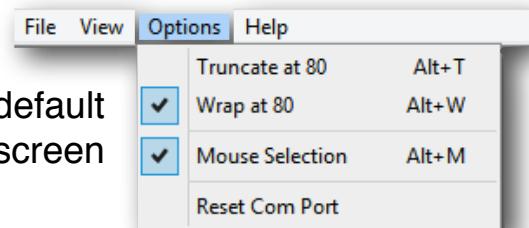
This prompts you for the name of the file, and then starts saving anything that arrives in GilderTerm through the serial port.

This can be used to capture configuration files from many pieces of GilderGear. Once the download completes, just select this command again to end capturing text. To restore the configuration to the card, just send the file back to the GilderGear using the 'Send File to Card' command.

You can also use this command to document the state of the configuration of the GilderGear. Do this by starting a 'Capture to File', then opening each configuration screen of each piece of GilderGear. Once you are finished capturing all the configuration screens, stop the Capture. You can then open the file in a text editor, and copy and paste the configuration screen images into your documentation for the show.

## 7) Truncate at 80

This tells GilderTerm to ignore any characters beyond 80 on a line. This is the default page width for all GilderGear menus, so the screen often will look better if this is left checked.



## 8) Wrap at 80

When checked, this tells GilderTerm to wrap each line automatically at 80 characters. It is not normally used when talking to the 80 character wide GilderGear menus.

## 9) Mouse Selection

The GilderGear menus allow you to type the number or letter used for each command on the menus. When this is on, you can also click on the text to the right of each menu selection to activate them.

## 10) Reset COM Port

This tells GilderTerm to try resetting the COM port hardware. If the USB cable has come unplugged, this may not be sufficient to bring it back to life. Windows *really hates* when this happens! You may need to quit GilderTerm, unplug and replug the USB cable, and then restart GilderTerm or Pc•MACs to get it going again.

## Show/Hide Soft Console [F5]

The Soft Console must be enabled under the '[Preferences](#)' menu's '[Consoles](#)' dialog. You will want to disable any console types you aren't using on your show.

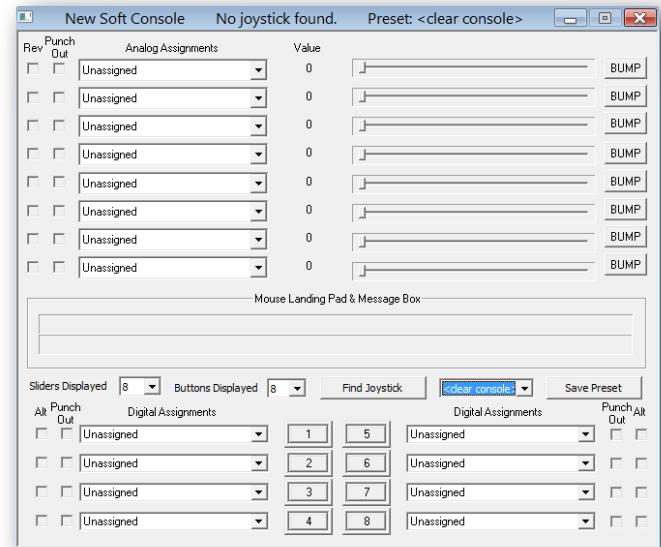
This command is available is used to show (or hide) the Soft Console.

The Soft Console is the most commonly used programming console in Pc•MACs. It can be used to program shows simply by pressing the buttons and moving the sliders on the screen. It is also the conduit through which the USB-Slider console, USB-MbJoystick, USB-AtoD or gaming joystick are attached to a Pc•MACs system.

The upper half of the Soft Console is used for assigning and programming analog functions. You can select to display zero to eight analog functions using the 'Sliders Displayed' drop-down. Once they are assigned, the sliders can be moved using your mouse, or the first two enabled analog inputs can be moved using the X/Y movements on your mouse. Click on the 'Mouse Landing Pad' to make sure that the Soft Console has retained Windows focus.

The 'Rev' checkboxes are used to flip the analog sliders end-for-end. The 'Punch Out' checkboxes are used to disable recording on the individual sliders. Even when Pc•MACs is in 'Record' mode, these 'Punched Out' analogs will remain in playback. The 'Bump' buttons are used to force the output to 100% when pressed, and return to the previous level when released. If in manual mode and EaselIn are enabled, the EaselIn speed will soften these outputs. When in Record or Rehearsal modes, the analogs will be bumped without any Easels.

The lower half of the Soft Console is used to program digital functions. The Soft Console supports as many as 40 digital inputs. Using the 'Digital Displayed' drop-down, you can choose to display between eight and forty digital inputs. The Digital's buttons can be pressed using your mouse on the screen, or using the numbers '1' through '0' keys on your PC's keyboard for the first ten digital inputs<sup>17</sup>.



<sup>17</sup> Be aware that the number of keys you can press simultaneously on a PC's keyboard will be well under ten. This will be a little better on a Macintosh's keyboard, but will still not be all ten keys. If you want to use all ten fingers, you will need to use a USB-Slider console, USB-MbJoystick or USB-AtoD.

The ‘Alt’ checkboxes are used to change the digital inputs from ‘Momentary’ to ‘Push ON/Push OFF’. The ‘Punch Out’ checkboxes are used to disable recording on the individual digital inputs. Even when Pc•MACs is in ‘Record’ mode, these ‘Punched Out’ digital inputs will remain in playback.

If an external USB-Slider console, USB-MbJoystick, USB-AtoD or gaming joystick is plugged in and recognized (press the ‘Find Joystick’ button), you can use the buttons on the console/joystick in addition to the numeric buttons on your keyboard and on-screen buttons on the soft console.

Once the Soft Console sliders have been taken over by an external console/joystick, you will no longer be able to move the on-screen sliders with your mouse.

Be aware that the update rates and resolution of most gaming joysticks are not as high as the ADCs we use on the USB-Slider console, USB-MbJoystick, USB-AtoD (12 bits). When you see the analog data from a gaming joystick on the OffLine Editing Window, you may see lots of jaggies and jumps, that you may need to clean up afterwards.

Because many joysticks have their analog inputs in different orders (or skip channels entirely), there is a function on the Soft Console that allows you to rearrange the inputs as needed. RightClicking on the assignment drop-downs opens a popup menu that allows you to move each slider input up or down the Soft Console. This is easiest to do if you first assign all eight analogs to your outputs. You can then see which joystick axis goes to which Soft Console channel.

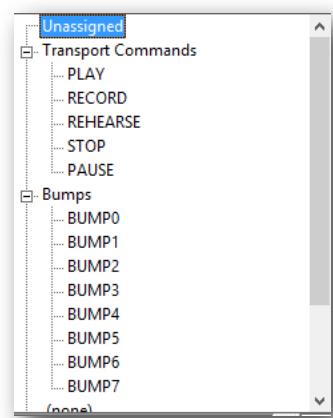
## Assigning Analog and Digitals to the Soft Console

You can assign analog and digital functions to the Soft Console inputs by clicking on the drop-down and finding your channels. If you have put your analogs/digital outputs into folders, you will need to open these folders to locate your outputs. If you didn’t put your outputs into folders, your outputs can be found inside the folder named ‘none’.

When you are assigning analog functions, you will only see the analog outputs you added to the [Channels List](#) on the inputs’ drop-downs.

When you are assigning Digital inputs, you will see your digital functions from the [Channels List](#), as well as ‘Bumps 0-7’ and ‘Transport Commands’.

The ‘Bumps’ allow you to assign ‘Bump’ functions to the digital inputs. Just like the ‘Bump’ buttons adjacent to each of the analog sliders on the Soft Console.



The ‘Transport Commands’ allow you to assign the basic

transport commands found on the Main Control Window to the Soft Console (and to any attached external USB console or joystick). This saves you the trouble of reaching over to the keyboard and/or mouse to access these ‘transport’ commands. They can be right on the console where you are working.

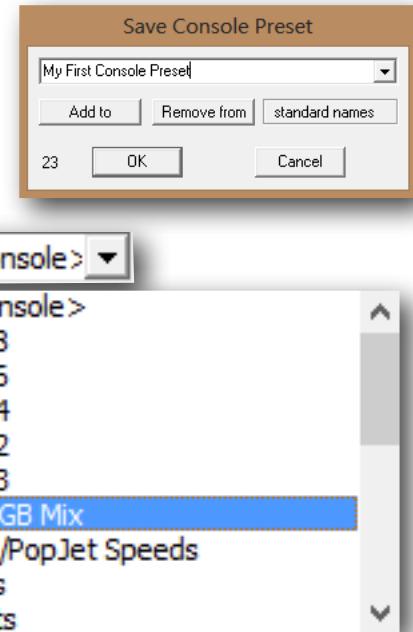
Once you have the inputs assigned on the Soft Console, you can save the current setup as a ‘Console Preset’. Press the ‘Save Preset’ button. Enter the name for your new console preset.

If you regularly use the same names for presets across multiple projects, you can build up a list of ‘standard names’ for Console presets. If you have a name you want to use again later, just press the ‘Add To’ button. That name will now be available from this dialog’s drop down across all of your GilderProjects. Instead of typing the name again, you hit the arrow at the right of the drop down to display all the ‘standard names’ you have previously saved, and pick the one you want to use.

To remove a name from the list of ‘standard names’, just pop it up, or type it in. When you press the ‘Remove From’ button, any name which matches the text in the drop down will be removed from the ‘standard names’ list.

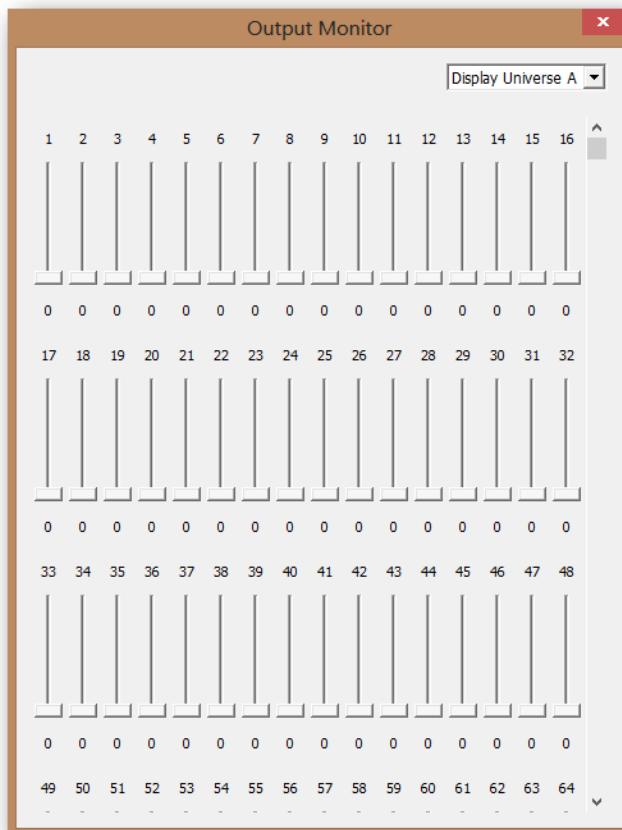
You can instantly switch between saved Soft Console Presets using the adjacent drop down. There you will find all the console presets you have already saved. You can also load and save console presets from the [‘Realtime’ menu](#) and the ‘Main Control Window’.

**Hint:** Save a console preset called ‘<Clear Console>’ with nothing assigned to the Soft Console at all. It will save you time when you need to start a new console preset by clearing off whatever is on the Soft Console.



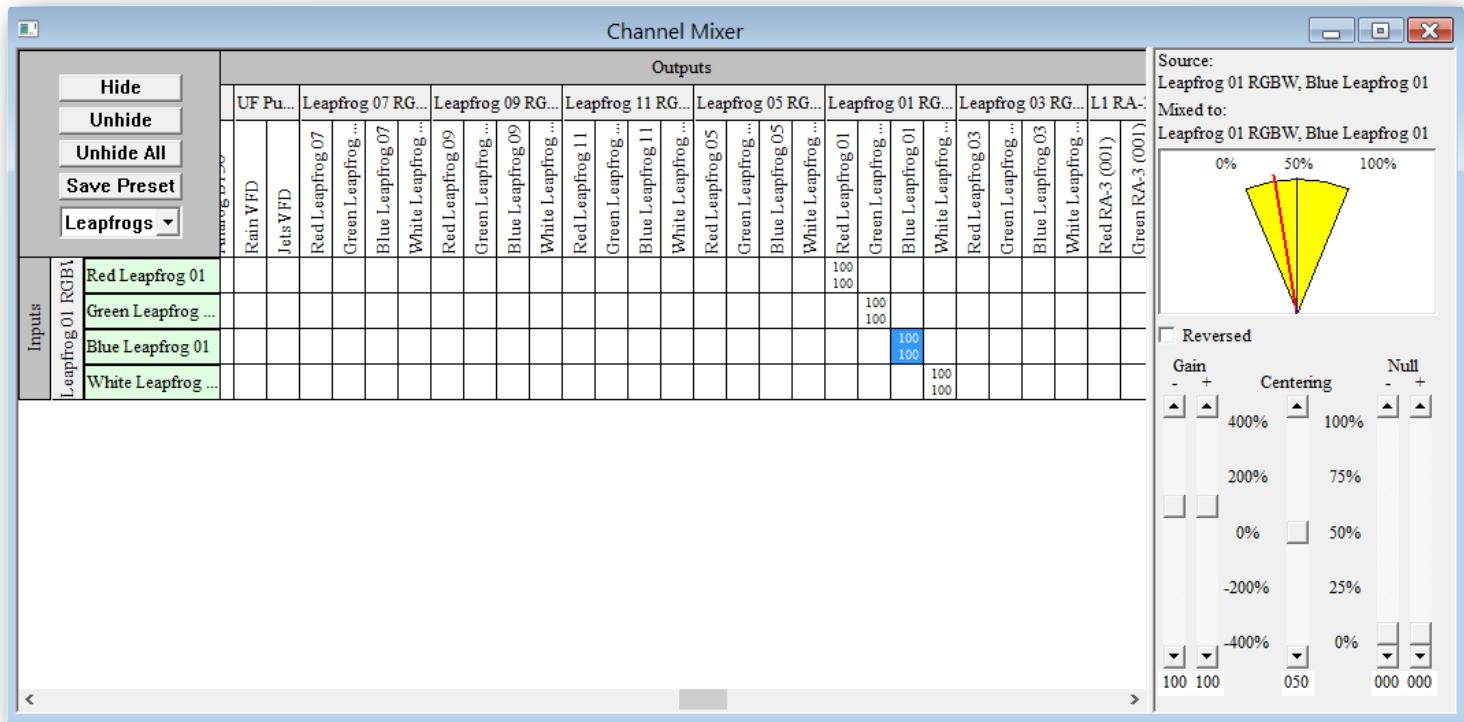
## Show/Hide Output Monitor (<Control>+F5)

The output Monitor is a debugging tool that lets you display all the DMX-512 output channels used in your show. All DMX-512 channels (even digitals) are displayed as analog sliders.



You can scroll to see any 64 channel range of outputs to monitor. The drop-down at the top of the window allows you to select between different universes.

## Show/Hide Channel Mixer [F6]



This command is used to show or hide the Channel Mixer Window. The mixer can be used to mix any combination of analog input(s) into any combination of output(s). For those of you with experience in operating lighting boards, think of this as the 'patch', but with a lot more options when processing the channels.

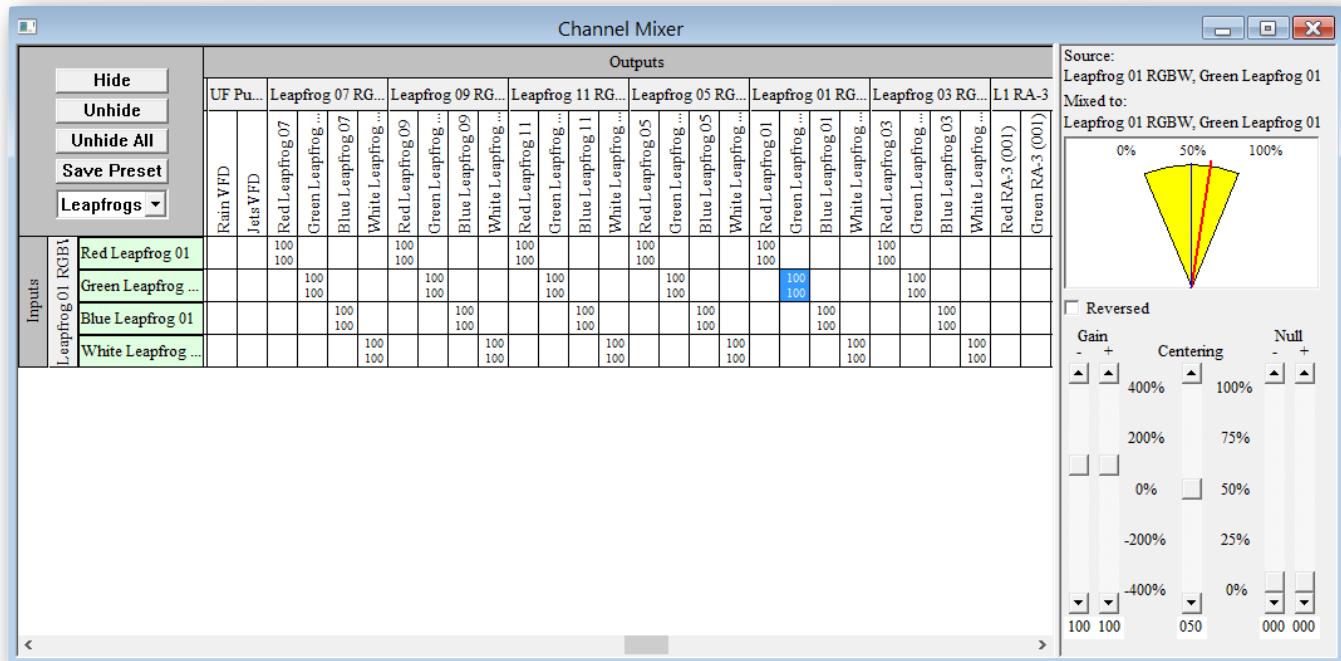
The Mixer Window functions are only available if you have a programming console attached to the system and have enabled the '[Preferences](#)' menu's Active Channel Mixing toggle. The red 'needle' on the pie chart will only be updated if the 'Manual' mode is 'On'.

A single Red/Green/Blue/White (RGBW) LED light fixture has been assigned on the console. Shown above is the default mix for these inputs. This is a diagonal line of cells with the mix set for 100/100. The console channel assigned on each input on the console is routed without anything being changed to the corresponding output. In this case, the first console input is assigned to 'Red LeapFrog #01' which is routed directly to the output for 'Red LeapFrog #01'. The second console input assigned to 'Green LeapFrog #01' routes to 'Green LeapFrog #01'. On the third and fourth console inputs, 'Blue LeapFrog #01' goes to 'Blue LeapFrog #01' and 'White LeapFrog #01' goes to 'White LeapFrog #01'. The result would be the same whether the mixer is on or off. If you do a RealTime 'Record', only the one RGBW light fixture will get data programmed into it.

Within the Mixer function, inputs of different resolutions are all processed at thirty-two bits of resolution. This allows them to be mixed into any output of any resolution. This means that a console input of one resolution can simultaneously be mixed into several different outputs, each of which has a different output resolution. Inputs can be set with asymmetrical gains and the centering offset to any point between 0 and 100%. Inputs can be set with a null to allow inputs to have no effect until an input has exceeded a threshold.

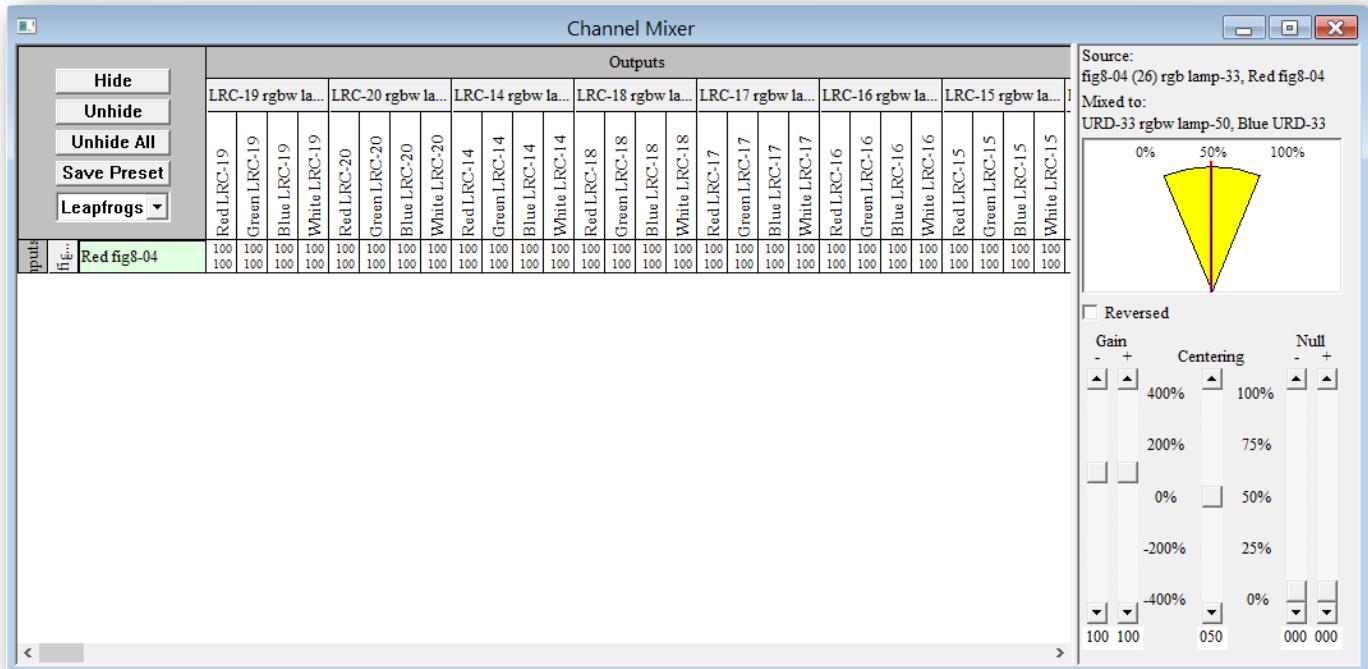
Examples of the possible use of the Active Channel Mixing are:

- Animation systems traditionally have a single input fed to a single output. In lighting systems, it is common to have a single control change a number of different dimmers. A single input can control any number of outputs at any possible ratios. Additional inputs can be mixed into the brightness controls to add highlighting, color or contrast changes.



- Here the ‘default’ mix from above has been extended so that each input controls the 6 RGBW lamp fixtures corresponding colors. No other processing was added to the data as it comes in from the console and goes out to the light fixtures. You turn up one Red light in this mix, all six red lights will come on. If you do a RealTime ‘Record’, all six RGBW light fixtures will get the identical data programmed into them:
- In cases where you need more sensitivity on the input control, you can increase the gain of an input that feeds to one or more outputs until a small movement on the input will cause a full scale movement on the output.

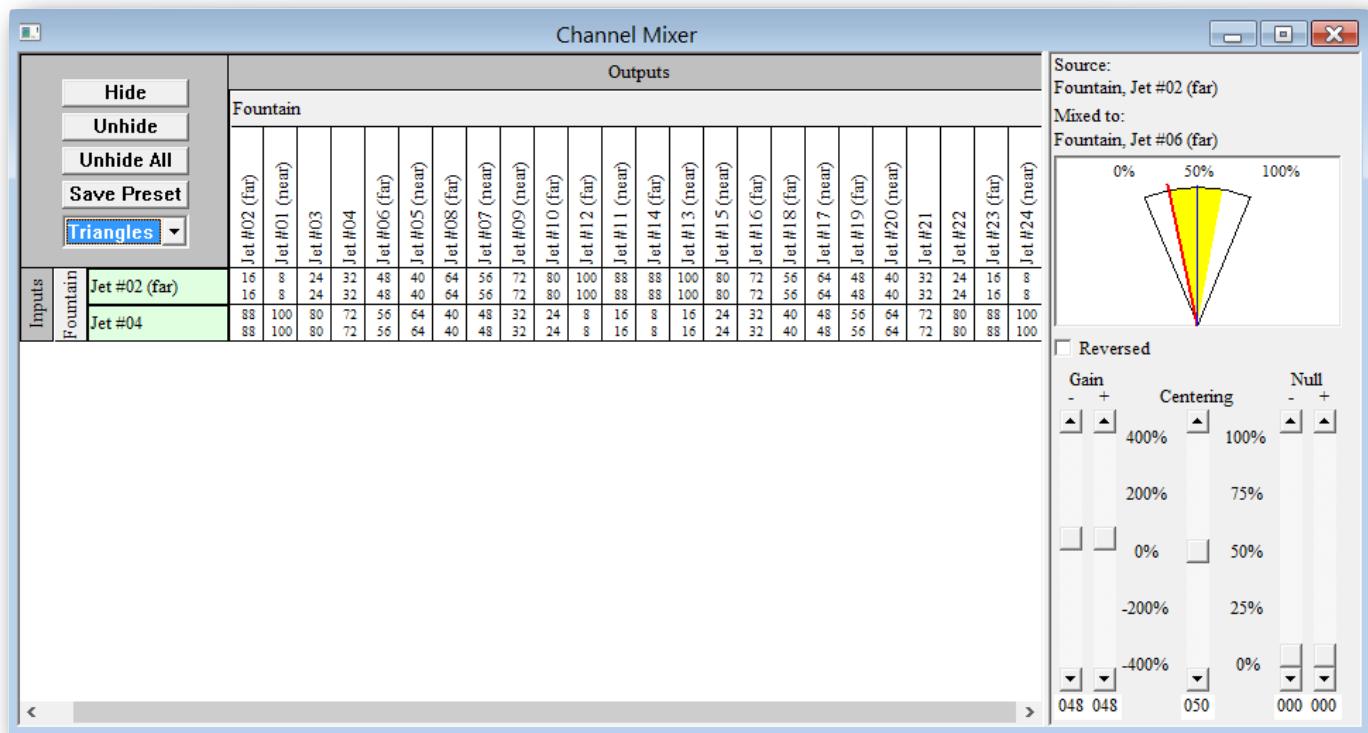
- d) An easy way to test all the lights in an installation is to assign a single input on the console, and then select all the lighting outputs on the mixer and set them all to 100/100. Now all the lights will follow that one console slider:



- e) When you have multiple movements that combine to provide a single movement on a figure. An example might be in an animated elephant trunk or snake with a number of different analogs down its length. A single input can control all the actuators down the length of the animation that cause it to curl in the appropriate direction. Additional inputs can be mixed in at lesser ratios to give the snake or trunk the proper amount of wiggle.
- f) Facial movements can be combined so that a single control can be used to make a figure smile or frown by adding and subtracting values from a number of different facial actuators. Similarly, 'f's and 's' mouth expressions can be put onto separate controls.
- g) Since eyes normally lead a figure's head and body turns, all these movements can be combined on a single input. As you move this control, the eyes lead, followed by the rest of the figure's head and body.
- h) If you have eye movements that include separate eyes up/down and upper and lower lids, you can assign a single input that will raise the upper eyelids when the eyes look up, but only beyond a certain point, and move down as the eyes look down, but again only when the eyes look down beyond a certain point. The same

thing can be done to with the lower lids. A second control can be used to ‘blink’ both eyelids, bringing the upper lid down a lot while bringing the upper lids up by just a little.

- i) For programming fountains. If you have a line of analog jets, one console slider can be configured to bring these jets up in an pyramid-shaped pattern (higher in the middle than at the two ends). A second console slider can be set to bring these same jets up in a ‘V’ pattern (lower in the middle than at the two ends). By bringing both of these console sliders up at the same time the jets come up in a straight line. ‘Dancing’ between the two shapes to the beat of the music is an easy way to program a musical show<sup>18</sup>.



- j) Assign two analog inputs on the console. On the first slider, the middle jet follows 100/100, and first and last jet in the line follows only 8/8. The jets inbetween the ends and the center are scaled between these two extremes. If you bring this slider up by itself, it makes a ‘pyramid’ shaped line of water.
- k) On the second console input, the settings are just the opposite. The two outer jets follow 100/100 and the center jet is only 8/8. Again the other jets are scaled

<sup>18</sup> Note that in the sample ‘Mix’ Illustration above is from an actual 24 jet musical fountain. The first two outputs were wired in the wrong order, so the values are flipped in the first two columns.

between these two values. If you bring this slider up, it makes a ‘V’ shaped line of water.

- I) To make calculating the ‘gain’ values easier, you can use a simple spreadsheet (Excel, Numbers, etc.). Use the spreadsheet’s charting function to preview the shape of the pattern.
- m) For programming motion bases you can create a mix to make it easier to program all the axis at one time. If you have a three axis motion base with one cylinder at the front middle and two at the back corners, you can set up a single input that raises and lowers all the cylinders at the same time. This becomes the ‘heave’, that acts like the ‘cyclic’ control on a helicopter to raise and lower the motion base as a whole. A second control can be set to raise the front cylinder while lowering both of the rear cylinders. This will act as the ‘pitch’ control. The final control raises one rear cylinder while lowering the other. This input acts as the ‘roll’ control for programming the motion base. These three controls can easily be fed in from a pair of joysticks.
- n) Whole banks of moving lights can be configured to run from a small number of inputs. Two inputs can provide the main x/y axis control, while other inputs can provide the offset to aim the lights to different focus points and control the color mixers, gobos and other effects.
- o) With just a few mouse clicks you can select all the outputs that have been created on a system and tell them all to follow a single input. This is useful for doing the initial wiring and checkout of a new show installation.
- p) It isn’t uncommon to have two or more axis of a figure that can hit each other. An example of this is if a figure can bring one arm over to a point to where the other arm can hit it. This can be prevented by setting a mix between the axis that move the arms together. The inputs that control each arm can be fed into the other arm with very high null and gain settings. If the arms are moved into an unsafe position the null point you have set will be exceeded and will counteract the commands that are bringing them together.

There is one thing you should not use the Mixer functions for. This is to set the ‘endpoints’ for a movement. Using the Mixer functions you can easily limit the range of command sent out to an analog function so that Pc•MACs never sends out a signal that reaches either 0% or 100%. The problem with doing this is that the analog output device will never be able to take advantage of its full resolution, and any other command (or at power up), the output will still be able to reach 0% or 100% and potentially damage your figure. Endpoints should always be set on the output card that is being used. These local endpoints are set immediately on power up of the card so that the output will never

go under or over the limits you have set. See the specific instructions for the analog output card you are using as to how this is done. In most cases, it is simply a matter of talking to the output card through the serial port from your computer.

The Mixer Window displays all the outputs that have been created for a show along the top. Above the individual outputs are the figures in which the outputs are assigned. Along the left side of the window are all the analog inputs that have been assigned on the currently selected console. The default mix for each cell is 100%/100% for each input to its corresponding output. The current mixer gains for each cell is shown in it.

Scroll bars can be used to move the view of the individual panes of the Mixer Window. The divider line between the left and right panes can be moved by grabbing and sliding it with the left mouse button

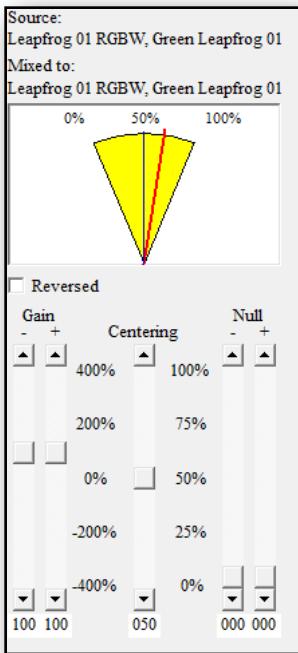
Any individual cell can be selected by clicking on in. In the following window a single Head Nod Input/Head Nod Output cell has been selected. You can see the name of the selected cell over the pie chart at the right side of the Channel Mixer Window. Blocks of cells can be selected by using the **<shift>** key and then clicking or by clicking on a cell and sliding the mouse while still holding the left mouse button down. Discontinuous cells can be selected by holding down the **<Control>** key and clicking on different cells. All the inputs or outputs can be selected by clicking on the words ‘Inputs’ or ‘Outputs’. Entire figures can be selected by clicking on a figure name on either the input or output side of the window. Individual rows or columns can be selected by clicking on the movement names on either the input or output sides of the window.

At the right of the Mixer Window are the controls for the selected cell(s). The black lines that make up the ‘pie chart’ shows the minimum and maximum range for any output. This is of course zero to one hundred percent. The areas shown in yellow behind the pie is the range of movement that the selected input will produce at the current gain, centering and null settings. If the yellow extends beyond the lines that show the zero and one hundred percent points, that is where the outputs will be clipped. It isn’t possible to send a signal that is smaller than zero or larger than 100 percent. The blue line shows the centering for the input. This is the point that is equal to 50% of the input signal. If the gain is set asymmetrically, this is the point where the output switches from following the ‘below center’ gain setting and starts following the ‘above center’ gains. The red line shows the current level for the output that has been selected. If ‘Manual’ mode is ‘On’, as you move the input(s) that effect this output, you will see the red line move. You will note that this red line can never go above or below the zero and one hundred percent points on the pie chart.

When a Console Preset is saved with the Channel Mixing Active, the mixer settings are also saved as a part of the Console Preset. When you call up a previously saved

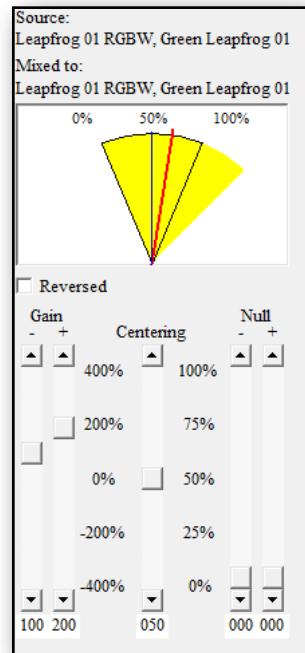
Console Preset, all of the settings on the programming console and all the mixer settings will be restored.

In the following examples, the settings available on each cell are used one or two at a time. Typically they are used in far more complicated combinations. The possibilities are endless.

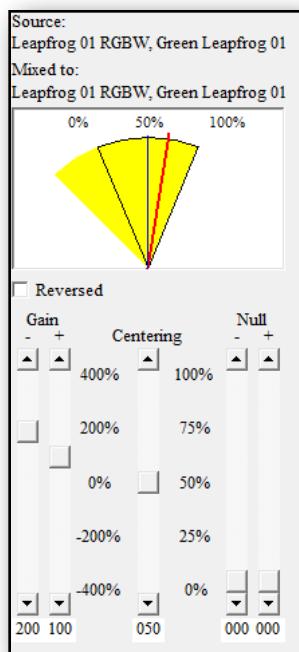


**1)** The ‘above center’ and ‘below center’ gain controls are set to 100%, the centering is set to 50%, and both null controls are set to 0%, then the yellow area (and so the range of movement) will extend from 0% to 100%. The input will follow the output at a 1:1 ratio. This is the default condition for each corresponding input to output cell.

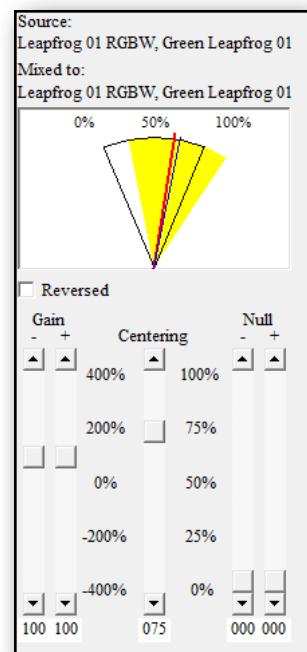
If you click on the ‘Reversed’ checkbox, the output will now be reversed from the input.



**1** If you increase the gain on the ‘above center’ side, you can see that the yellow area above the 50% point (50% point is indicated by the blue line at the center), will expand beyond the 100% output point. If you move the input, you will see that it will follow 1:1 up until the 50% input point. With the ‘above center’ gain set to 200%, you will see that the output above the 50% input level follows at twice the speed until the output reaches the 100% output point, where it is clipped. This means that the last 25% of the input is ignored. **2**



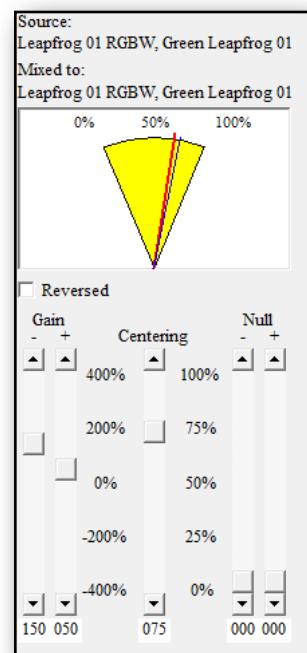
3) If you increase the gain on the ‘below center’ side, you can see that the yellow area below the 50% point (50% point is indicated by the blue line at the center), will expand below the 0% output point. If you move the input, you will see that it will follow 1:1 when it is over the 50% input point. With the ‘below center’ gain set to 200%, you will see that the output below the 50% input level follows at twice the speed until the output reaches the 0% output point, where it is clipped. This means that the bottom 25% of the input is ignored.



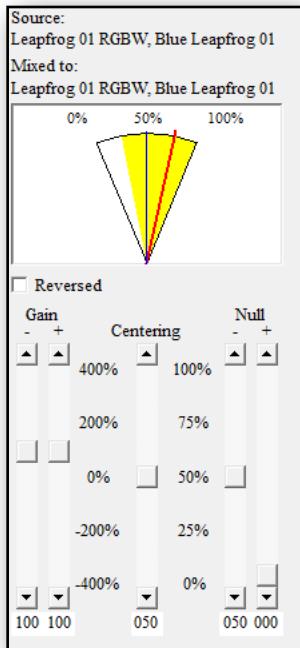
4) In this example, the gains are both left at 100%, and the centering control is swung upwards. The yellow area that shows the total range of movement from this input swings as a whole upwards. Now the output will follow 1:1 across the full range of the input, but can never get below the 25% output point and will clip at 100% as the input passes the 75% point. Again the top 25% of the input control will be ignored.

5) Adding to the last example, the centering has been left at 75%. The ‘below center’ gain has been raised and the ‘above center’ gain has been lowered until the output from this input will swing the output fully from 0% to 100%. Instead of following at a 1:1 ratio, the area below the 50% point will move faster than the area above the 50% point.

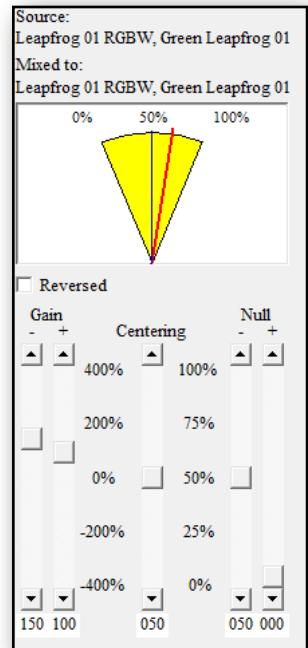
If the Centering is set to either 0% or 100%, then the mixer will enter ‘Unipolar mode’. The ‘above center’ and ‘below center’ of the gain and null controls will be locked together. The gain will be linear across the whole range of the inputs. The null will subtract from the 0% end of the input control if the centering is set to 0%, or from the 100% side of the input if the centering is set to 100%.



**6)** Here the gains have both been set back to 100% and the centering to 50%. The ‘below center’ null controls how much of the input below 50% is thrown away.



The ‘above center’ null controls how much of the input above 50% is thrown away. In this case the ‘below center’ null has been raised to 50%, swinging in the yellow area below the 50% point to 25%. For inputs above 50%, the output will follow 1:1. For inputs from 25% top 50%, the input will have NO effect on the output. As the input goes below 25% it will begin to have an effect on the output and it will follow at a 1:1 ratio between 25% and 50%.



**7)** Adding to the previous example, we are now going to increase the ‘below center’ gain until the output will reach all the way to the 0% output point. Now the output will follow at a 1:2 ratio as the input moves from 0% to 25%. At the 35% input level the output

(6) (7)  
will reach the 50% point. There it will stay as the input moves through the ‘null’ zone from the 25% to the 50% points. Above the 50% input point, the output will still follow at a 1:1 ratio.

There are four settings under the [‘Preferences’ menu’s](#) to control the behavior of the Channel Mixer:

- 1) [‘Active Channel Mixing’](#): This toggle disables all calls to the Channel Mixer. Even if you have mixes set on the Channel Mixer, they won’t be active.
- 2) [‘Mix During Playback’](#): If this toggle is OFF, Pc•MACs will simply play back whatever is recorded on both the mixer input and output channels when ‘Playing’. The mixer will be completely inactive.

If the Mix During Playback toggle is ON, Pc•MACs will process the data in any channels that are designated as inputs to a mixer through to the outputs that are designated as the outputs of the mixer. The data in the outputs of the mixer will be a combination of the data recorded into all the mixer input channels. No recorded data is modified in any way.

- 3) [‘Mix During Rehearsal’](#) !!!!
- 4) [‘Average Mixer Outputs’](#) If the Averaging toggle is OFF, the analog channels that are mixed simply by adding them together. If your are mixing together two

channels (at 100%/100%) into a single output, setting either input to 100% will set the output to 100%. If you set both inputs to 50%, the output will be at 100%. If you set both inputs to 100%, it will try to set the output to 200% (which will be range-limited to 100%).

If the Averaging is ON, Pc•MACs looks at the number of inputs that are feeding into each output. If there are two inputs feeding an output, the sum of all the inputs will be divided by two before sending it to the output. Each input now has control of 50% of the output. To set the output to 100%, you will have to set both inputs to 100%. If there are three inputs feeding and output, it will divide by three before sending it to the outputs. Each input has 33.3% of the control over the output, and all three inputs will have to be set to 100% to drive the output to 100%. The same works averaging works for any numbers of inputs feeding one output.

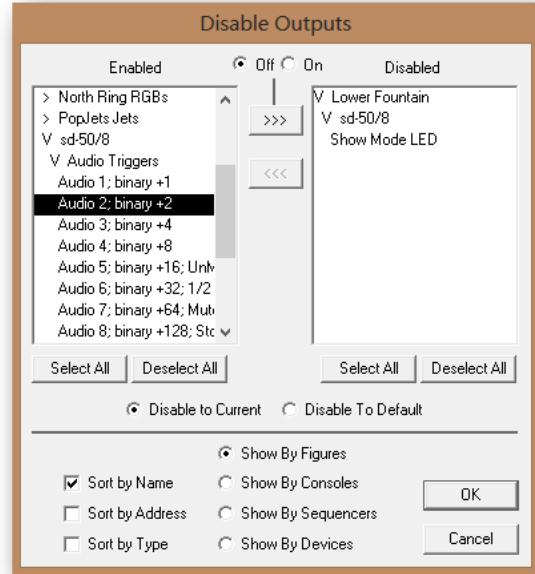
The Mixing functions are one part of Pc•MACs that uses the PC's processor to do some heavy lifting. Do not attempt to do any complicated mixing if you are running Pc•MACs on a slow computer. When the '[Preferences](#)' menu's Active Channel Mixing is turned 'Off', the code is not called at all. You should turn 'Off' the Channel Mixing functions if you are not using them.

## Disable Outputs... (<Control>+D)

This command brings up a dialog where you can select any analog or digital outputs and freeze them at their current level, force them to any other level, or set them to their default level.

The dialog has two columns in it. All the channels which have been assigned appear in the left column. These can be shown by:

- The 'Figure' folders the movements have been assigned to.
- The Console Presets the movements have been assigned to.
- Alphabetically by the movement names.
- Numerically by the addresses assigned for the outputs.
- By Types. This segregates the analogs and digital functions, and sorts them separately using the criteria set above.



To disable a channel, all you need to do is select it in the left column and move it to the right ‘disabled’ column. By default, the disabled channel will stay at whatever its current level is, but you have the option of forcing the channel to its default level, or a level you manually select.

Any output that has been disabled should stay in its frozen position until you release it. The disabled channels are stored in the project’s site file, so outputs will stay disabled until you manually release them.

If another show is opened which uses the same Site File, the disabled outputs will still be disabled. Pc•MACs will warn you that there are disabled channels. This is so you don’t spend half a day trying to figure out why these disabled outputs aren’t operating.

## **Set Output to First Frame <Home>**

If ‘Manual Mode’ is ON, this command tells Pc•MACs to send the show’s first frame data to the outputs. It is used as a quick way to get all the outputs back to the starting positions. When used in conjunction with the Set Outputs to Last Frame command, it is an easy way to spot show ends that don’t match up properly by bouncing between the first and last frame of your show. If the Ease-In function is ON, then the outputs will move to the new positions at the speed set by the [‘Preferences’ menu’s Ease-In Options dialog](#).

## **Set Output to Last Frame <End>**

If ‘Manual Mode’ is ON, this command tells Pc•MACs to send the show’s last frame data to the outputs. It is used as a quick way to get all of the outputs back to the ending positions. When used in conjunction with the Set Outputs to First Frame command, it is an easy way to spot show ends that don’t match up properly by bouncing between the first and last frame of your show. If the Ease-In function is ON, then the outputs will move to the new positions at the speed set by the [‘Preferences’ menu’s Ease-In Options dialog](#).

## **Play [F1]**

This command tells Pc•MACs to start playing back any programmed data for whatever show is currently loaded. If the show is Smpte time code locked, it will start listening for time code to lock on to. If it is a DVD/LaserDisk show, then the commands you have entered for the DVD/LaserDisk Start String (set up on [‘File’ menu’s Show Info dialog](#)) will be sent out through the DVD/LaserDisk port.

Show playback normally starts at the beginning of the show, unless the 'Start Time' slider has been set. Internally, Externally and DVD/LaserDisk clock shows will simply start at 'Start' time. Smpte shows, being at the mercy of the tape position, will start listening for time code but won't start updating the outputs until the 'Start' time has passed.

Show playback normally continues until the end of the show is reached. If the 'Stop Time' slider has been set for any time before the normal end of the show, then it will be used to end the playback.

If Pc•MACs is in 'Record' or 'Rehearsal' mode when this key is pressed, then all the currently assigned inputs will be 'punched out' and the show will continue in 'Play' mode.

## **Record (<Control>+[F1])**

Just like 'Play' above, except that the programming console will be checked for any assigned inputs and any new data will be recorded. If the Auto Punch option has been turned 'On', then the show will be started as a 'play', and then automatically 'punch in' and 'punch out' at the appropriate times. After the 'punch out' time has passed, then Pc•MACs returns to a 'playback' mode.

If Pc•MACs is in 'Play' or 'Rehearsal' mode when this key is pressed, then all the currently assigned inputs will be 'punched in' and the show will continue in 'Record' mode.

## **Rehearsal (<Shift>+[F1])**

This works just like the 'Record' mode above, except that no animation data is saved.

If Pc•MACs is in 'Play' or 'Record' mode when this key is pressed, then all the currently assigned inputs will be 'punched in' and the show will continue in 'Rehearsal' mode.

## **Stop <space bar>**

This command stops any current 'Play', 'Record', or 'Rehearsal'.

The outputs of the system will stay at the levels programed for the instant the show was stopped. If the show is using a DVD/LaserDisk, then the End String you requested on the ['File' menu's](#) Show Info dialog will be sent out.

## Pause/Continue (<Shift>+<space bar>)

When a show is running in either 'Play', 'Record', or 'Rehearsal' modes, this button will stop the current show running at the current frame and the button will turn into a 'Continue' command. If 'Manual' mode is active, control of the show will return to any attached programming console (after an Easeln, if this option is also active). Once a show is Paused, pressing any of the 'Play', 'Record', 'Rehearsal' or 'Continue' button will start the show playing/recording/rehearsing from the frame at which the show was paused.

## Manual Mode [F3]

When Pc•MACs is idle, the 'Manual' mode can be used to send data from any assigned inputs on the programming console to the outputs. This allows you to move figures for testing and to get the feel of them before you start recording a show. When 'Manual' mode is OFF, the outputs will only be updated during a 'Play', 'Record', or 'Rehearsal'.

## Easeln Toggle

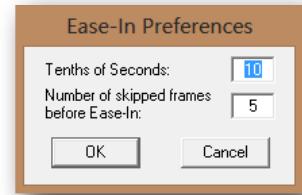
The Easeln toggle tells Pc•MACs to try to keep analog movements from moving too quickly when you give Pc•MACs any command that might otherwise cause them to jump. An adjacent 'radio button' shows when any Easeln is taking place.

An Easeln is triggered:

- a) When you start or end most Play/Record/Rehearsal modes
- b) enter 'Manual' mode
- c) When an external timecode (Smpte or DVD/Laserdisc) your show is following jumps by more than a predefined number of frames
- d) When you 'Bump' an analog channel on the Soft Console

The Easeln does not effect the data that is being recorded into your show.

How long the Easeln takes to ramp the analog functions is set on the ['Preferences' menu's](#) Easeln option dialog. You can set the length of the Easeln (in tenths of seconds) and the number of discontinuous frames it takes to trigger an Easeln when running from Smpte or DVD/Laserdisc timecode.



## Auto Punch Toggle

Auto Punch is used when you need to RealTime program a part of your show, but there may be good data before and/or after the part of the show you want to program.

When 'On', this toggle tells Pc•MACs to check the 'Punch In' and 'Punch out' sliders on the Show Transport Window when starting a 'Record' or 'Rehearsal'. If enabled, Pc•MACs will stay in 'Play' mode until the 'Punch In' time is reached. It will then go into 'Record' or 'Rehearsal' mode, as requested. It will stay in this mode until the 'Punch Out' time is passed. Pc•MACs will then return to 'Play' mode. Only the channels assigned to your console in the area between the punch In and Punch Out times will be altered.

## Auto-Inbetween

This function is used to automatically remove any jumps in the recorded animation data that might be created when you punch in or out an analog channel. This feature will remember the exact point in time where you made up to three hundred punches on any single Record pass. Pc•MACs remembers:

- a) When you punch in/out a single analog from the Pc•MACs Programming Console's 'Assignment' buttons or 'Punched Out' checkboxes.
- b) When you punch in/out all the analogs using the Auto Punch feature.
- c) When you punch in and out by hitting the 'Play', 'Record' or 'Rehearsal' Buttons.
- d) Or even when you just press 'Stop' to bail out of the 'Record' mode.

The options for this feature are set on the '[Preferences](#)' menu's Auto-Inbetweening dialog. These include the type of curves that will be used to remove the jump, how far before and after the punch points you would like the curve to extend, and whether or not you would like Pc•MACs to ask you before it automatically removes any jumps.

## Audio Cue Toggle (<Control>+B)

This is a convenience feature that allows you to set a show time when the PC will beep at you. This allows you to set an audible cue when there is nothing in the show's sound track to warn you of an impending event. The time is set using the slider on the Show Transport Window. This toggle is used to turn it 'On' and 'Off'.

## Looping Toggle (<Control>+L)

This toggle tells Pc•MACs that you would like to loop the section of your show that falls between the times set on the Start Time Slider and Stop Time Slider.

This poses no problems for Internally, Externally or DVD/LaserDisk clocked shows. Smpte shows, again are at the mercy of the tape position.

## Load Console Preset...

This command allows you to choose from a list of previously saved Console Presets for sending to the Pc•MACs Programming Console.

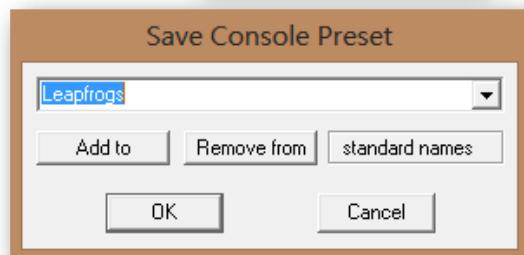
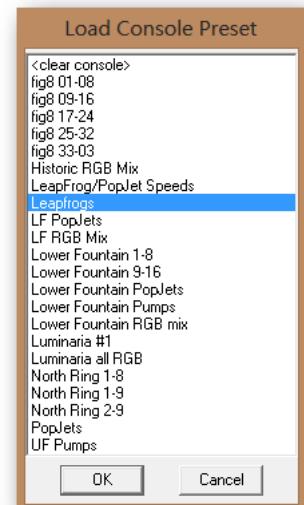
The quicker way of selecting Console Presets is to use the popup on the Main Control Window.

## Save Console Preset...

This command saves the status of the Pc•MACs Programming Console and the Channel Mixer under any name you give it. The current assignments of all the inputs along with whether any of the inputs are currently reversed or in 'Alternate Action' mode and if they are punched in or out are all saved as a part of the Console Preset. Any number of Console Presets can be saved and instantly reloaded using the Load Console Preset command or Console popup on the Main Transport Window.

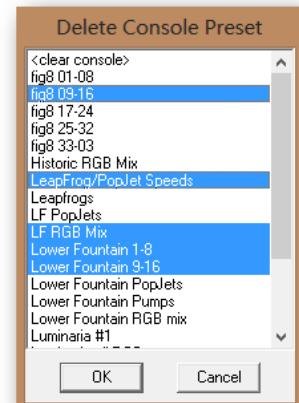
This name you give a Console Preset can be any text string of up to thirty-two characters. A popup is available that allows you to quickly use names from your list of Standard Console Names.

This list contains your most commonly used names so you don't have to enter them more than once. To add a name to the list of standard Console Names, type it into the entry box and press the 'Add' button. They will be sorted alphabetically. To remove a name from the list, type it in (or pop it up) and press the 'Remove' button. This standard list is stored in the 'CONSOLES.LST' file.



## Delete Console Preset

This command allows you to remove any previously saved Console Presets.



## Capture Console Channels

*This feature is only available if you have the MACs-License, it has been enabled under the '[Preferences](#)' menu's '[Consoles](#)' dialog and there is an available DMX-512 input device plugged into your PC.*

The Capture Console is used to import DMX-512 data from another source. This could be from an expensive lighting board, an old control system that is being replaced, or anything else that outputs standard DMX-512.

At the top of the dialog there is a drop down menu of all the available DMX-512 input devices. Note that most DMX-512 output devices (like Gilderfluke & Co's USB-to-DMX) can only transmit OR receive, so any of these that are already in use for transmitting DMX-512 will not be listed here.

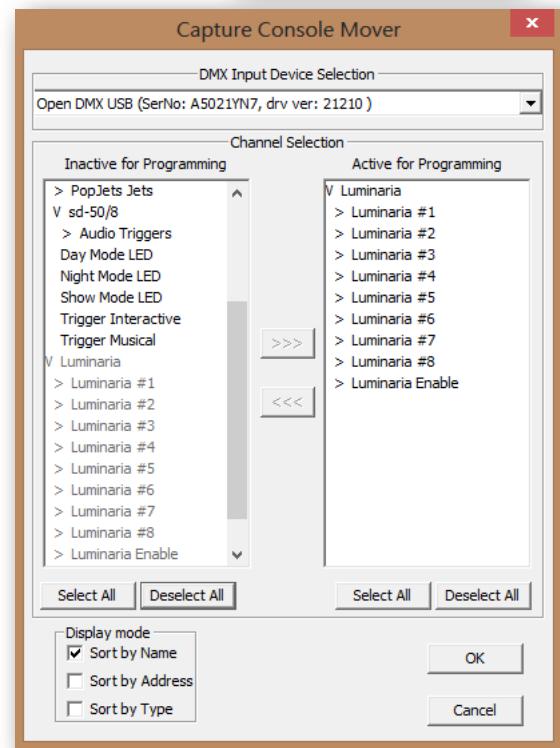
The remainder of the Capture Console dialog is a familiar two column 'mover'. All the channels that have been defined are shown in the left hand column. These can be sorted by:

- Alphabetically by the movement names.
- Numerically by the addresses assigned for the outputs.
- By Types. This segregates the analogs and digital functions, and sorts them separately using the criteria set above.

Any channels you want to record into should be moved to the right column.

All the channels in the right column must belong to the same DMX-512 universe. After the first channel is moved to the right column, channels from any other universe will be grayed out and unelectable.

Hit 'Play' on the source device as you start to 'Record' on Pc•MACs. Whatever DMX-512 that comes in through the DMX-512 port will be recorded by Pc•MACs.

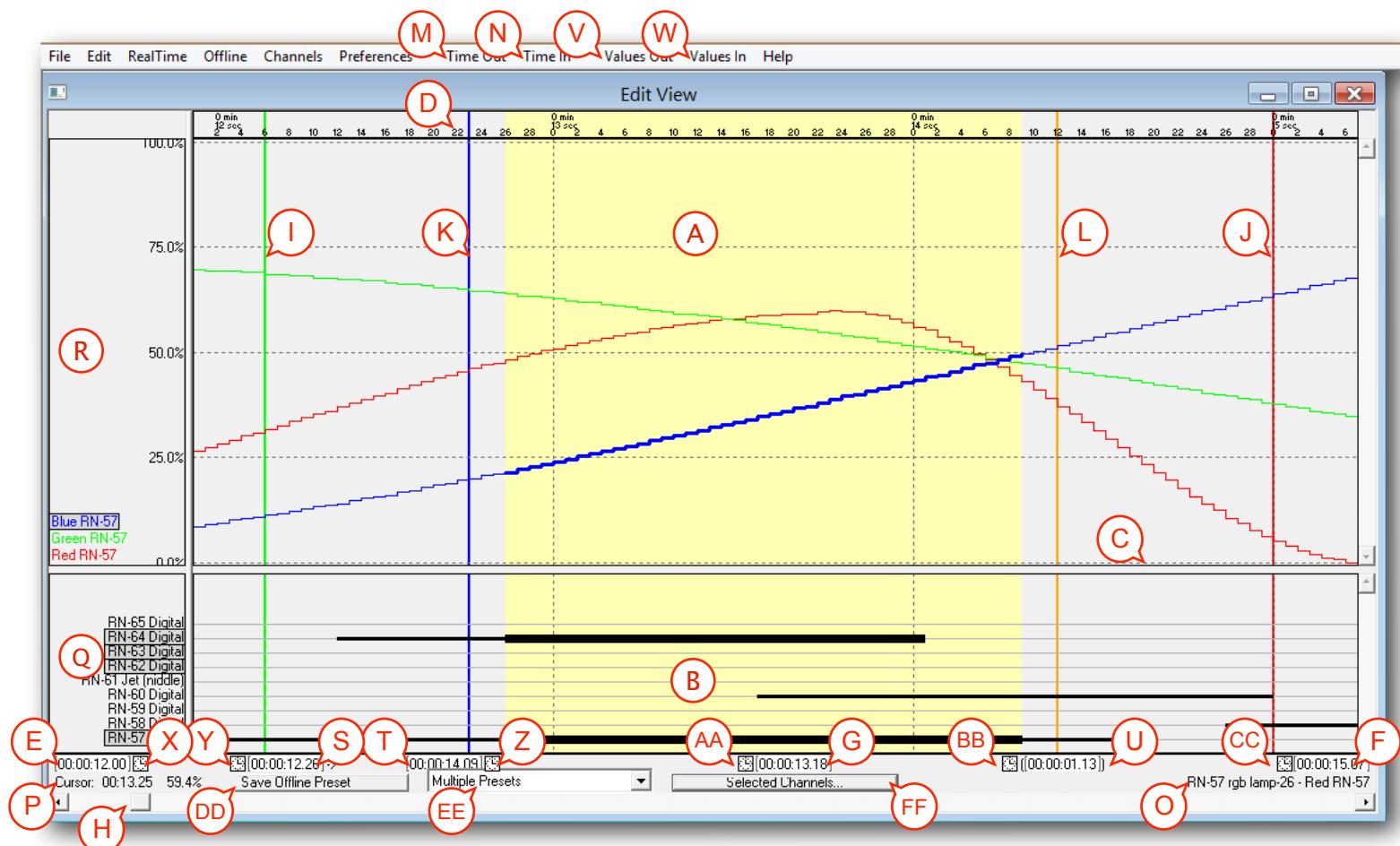


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## 'OffLine' Menu

The '[OffLine](#)' menu is where all the commands having to do with the OffLine Editing Window are located. Some simple shows are programmed entirely using the OffLine Editing Window. You will find that even with shows that are primarily programmed with RealTime recording of the movements, you will probably spend most of your time on the OffLine Editing Window tweaking what you recorded to make it absolutely 'perfect' before you AutoDownload it to your final playback devices.

### Detailed Tour the OffLine Editing Window.....



### The OffLine Editing Window

- A) On the OffLine Editing Window, you will see the analog (0-100%) functions displayed in the upper pane.

If nothing has been programmed on the analog channels yet, your analogs should appear as a horizontal colored line(s) along whatever has been set as the default value(s) for them (usually either 0% or 50% on the analog pane).

Each analog channel is assigned a color when it is created. You can change the color of the line by double clicking on the name of the channel in the [Channels List](#), and then pressing the ‘color’ button.

The selected range of time is shown as the area with the yellow background. The start and end of the selected area are shown by the times at ‘S’ and ‘T’. The amount of time is shown by ‘U’. If an analog is selected in the area of time which is selected, the line will be drawn more thickly, and will be effected by any analog editing command that is invoked (only the Blue Channel is selected in this example).

Channels that are not selected, or are outside of the selected range of time will not be altered by any editing command.

If the time is zoomed in closely enough that you can see individual frames, the analogs may appear a little ‘steppie’ to you. Don’t Panic! This is normal. As far as Pc•MACs is concerned, the data only changes levels on each frame transition, and most analog output GilderGear oversamples this data up to 4x the frame rate, which is far faster than any mechanical device can follow. If you don’t want to see the steps at each frame, just zoom the time scale out a bit.

B) The digital (on/off) functions are shown in the lower pane.

With nothing programmed into them, the eight digitals will appear as light blue lines running horizontally in the digital window pane. If the channel is ‘ON’, the line will be drawn in black. You can change the color of the line by double clicking on the name of the channel in the [Channels List](#), and then pressing the ‘color’ button.

The amount of time that the line is drawn in is the amount of time that the output will be ‘ON’ during your show. The selected range of time is shown as the area with the yellow background. The start and end of the selected area are shown by the times at ‘S’ and ‘T’. The amount of time is shown by ‘U’. If a digital channel is ‘ON’ in the area of time which is selected, the black line will be drawn as even thicker, and will be effected by any digital editing command that is invoked.

Channels that are not selected, or are outside of the selected range of time will not be altered by any editing command.

C) Separating the upper Analog pane from the lower Digital Pane is a movable divider. You can grab the dividing bar and move it up or down, or completely off the screen, as needed. If there isn’t enough ‘room’ for all the digitals, or if the analogs have had the ‘value’ scale zoomed in, a scroll bar for that pane will appear at its right side.

## Where in the show are we?

- D) Time is displayed along the top of the window. In this zoom level, the major markers are shown at each second through the show.
- E) The time shown at the lower left corner of the screen is the time at the left side of the window. The individual digits of the time can be altered by:
  - a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.
  - b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
  - c) The right and left mouse buttons can be used to increment/decrement the numeric value.
  - d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
  - e) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.
- F) The time shown at the lower right corner of the screen is the time at the right side of the window. The individual digits of the time can be altered by:
  - a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.
  - b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
  - c) The right and left mouse buttons can be used to increment/decrement the numeric value.
  - d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
  - e) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.
- G) The time shown at the bottom center of the screen is the time at the center of the window. You can think of this as the ‘playhead’, if you are use to audio and video editing software. The individual digits of the time can be altered by:
  - a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.

- b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
  - c) The right and left mouse buttons can be used to increment/decrement the numeric value.
  - d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
  - e) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.
- H) You can use the slider at the bottom of the screen to move to a different point in the show, or modify any of these times to move to a different part of the show.

If you have placed Drag-n-Drop Triggers on the OffLine Editing Window, hitting <Control>+<left arrow> or <Control>+<right arrow> instantly snaps the OffLine Editing Window to the last or next marker.

## Transport Time Markers

The ‘Transport’ markers effect what happens when you invoke any to the RealTime programming and playback commands (Play, Record, Rehearsal).

- I) The green vertical line marks the playback ‘Start’ time on the OffLine Editing Window. If you start playing/recording/rehearsing a show, this is where it will begin. This time can be set on the main transport window by moving the ‘Start’ slider, or the markers can be dragged around by clicking on them in the time bar at the top of the OffLine Editing Window. They can also be set using the shortcut ‘clocks’ on the OffLine Editing Window.

There is a shortcut you can use to instantly set the ‘Start Time’: Just double click anywhere on the analog or digital pane of the OffLine Editing Window (except on a channel or other object), and the start time will be set to that point in the show.

- J) The red vertical line marks the playback ‘End’ time on the OffLine Editing Window. If you start playing/recording/rehearsing a show, this is where it will end (or loop, if the ‘loop’ checkbox has been checked). This time can be set on the main transport window by moving the ‘End’ slider, or the markers can be dragged around by clicking on them in the time bar at the top of the OffLine Editing Window. They can also be set using the shortcut ‘clocks’ on the OffLine Editing Window.
- K) The blue vertical line marks the Record/Rehearsal ‘Punch In’ time on the OffLine Editing Window. If you start recording/rehearsing a show, before this mark

Pc•MACs will be in ‘playback’ mode. At this marker it will actually enter ‘record’ or ‘rehearsing’ mode. This time can be set on the main transport window by moving the ‘Punch In’ slider, or the markers can be dragged around by clicking on them in the time bar at the top of the OffLine Editing Window. They can also be set using the shortcut ‘clocks’ on the OffLine Editing Window.

- L) The orange vertical line marks the Record/Rehearsal ‘Punch Out’ time on the OffLine Editing Window. If you start recording/rehearsing a show, before this mark Pc•MACs will be in ‘record’ or ‘rehearsing’ mode. At this marker it will actually return to ‘playback’ mode. This time can be set on the main transport window by moving the ‘Punch Out’ slider, or the markers can be dragged around by clicking on them in the time bar at the top of the OffLine Editing Window. They can also be set using the shortcut ‘clocks’ on the OffLine Editing Window.

## **Zoom in and Out**

You can zoom in to see just a few frames of your show, or zoom all the way out to see the entire show at once. You can do this using the [‘OffLine’ menu’s Time Scale commands](#), or....

- M) ‘Zoom Out’ button at the top of the OffLine Editing Window.  
N) ‘Zoom In’ button at the top of the OffLine Editing Window.

You probably don’t want to zoom in or out too far. If you zoom in too far you will only see a tiny piece of your show. If you zoom too far out, you may not be able to see short events. By default, Pc•MACs will display two to four seconds of a show (depending on your computer’s screen resolution).

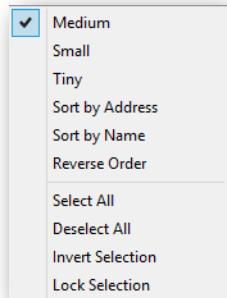
## **How do you tell which channel is which?.....**

- O) As you move the cursor over any analog or digital function, you will see its name displayed in the lower right corner of the window. This is one way you can tell one channel from another.  
P) The time at the cursor position is displayed at the lower left corner of the OffLine Editing Window. If you are moving the cursor in the analog pane of the OffLine Editing Window, the analog value of the cursor is also displayed. This makes it easy to estimate the analog value of a channel at any point on the screen by just moving the cursor over it.  
Q) The names of the digital functions are displayed at the left of the digital window panes.

You can rearrange the current order of the digital channels by simply dragging their names up or down within the list.

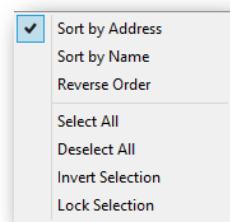
You can select a single digital channel for the currently selected range of time by simply LeftClicking on the name. You can hold down the <shift> key and make contiguous selections of channels, or hold down the <Control> key to make discontinuous selections of channels.

If you RightClick in this area, the following shortcut menu will appear:



- A) You can choose to display the text for the digital channels' names in...
    - a) Medium sized text
    - b) Small sized text
    - c) or Tiny sized text
  - B) You can sort the digital channels by...
    - a) DMX address (lowest address is at the bottom of list) (Default)
    - b) Alphabetically by name (first name is at bottom of list)
    - c) or reverse the order of the current sort
  - C) Select all the channels within the selected range of time
  - D) De-Select all the channels within the selected range of time
  - E) Invert the current selection of channels within the selected range of time
  - F) Lock the selection, so that until it is unlocked, cuts, pastes, insert time, delete time and all other commands only effect the current selection of channels.
- R) The names of the analog functions are displayed at the left of the analog window panes. You can rearrange the current order of the analog channels by simply dragging their names up or down within the list.

You can select a single analog channel for the currently selected range of time by simply LeftClicking on the name. You can hold down the <shift> key and make contiguous selections of channels, or hold down the <Control> key to make discontinuous selections of channels.



If you RightClick in this area, the following shortcut menu will appear:

- A) You can sort the analog channels by...
  - a) DMX address (lowest address is at the bottom of list) (Default)
  - b) Alphabetically by name (first name is at bottom of list)

- c) or reverse the order of the current sort
- B) Select all the channels within the selected range of time
- C) De-Select all the channels within the selected range of time
- D) Invert the current selection of channels within the selected range of time
- E) Lock the selection, so that until it is unlocked, cuts, pastes, insert time, delete time and all other commands only effect the current selection of channels.

### **Range of Time Selected?**

S) If a stretch of time has been selected on the OffLine Editing Window, this displays the start of the selected area. The individual digits of the time can be altered by:

- a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.
- b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
- c) The right and left mouse buttons can be used to increment/decrement the numeric value.
- d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
- e) If you <shift>+RightClick on either the analog or digital pane of the OffLine Editing Window (anywhere but ON an analog or digital channel), the end of the selected range of time will snap to where you clicked.
- f) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.

T) If a stretch of time has been selected on the OffLine Editing Window, this displays the end of the selected area. The individual digits of the time can be altered by:

- a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.
- b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
- c) The right and left mouse buttons can be used to increment/decrement the numeric value.

- d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
  - e) If you **<shift>+RightClick** on either the analog or digital pane of the OffLine Editing Window (anywhere but ON an analog or digital channel), the end of the selected range of time will snap to where you clicked.
  - f) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.
- U) If a stretch of time has been selected on the OffLine Editing Window, this displays the length of the selected area. If you modify this time, the amount of time selected on the OffLine Editing Window will increase or decrease symmetrically. The individual digits of the time can be altered by:
- a) Click on the digits to modify and type in a new numeric value. You can use the left/right keys to change which digits you are modifying.
  - b) The up/down keys increment/decrement the numeric value. You can use the left/right keys to change which digits you are modifying.
  - c) The right and left mouse buttons can be used to increment/decrement the numeric value.
  - d) Clicking on the numerals, and sliding the mouse up or down can be used to increment/decrement the numeric value.
  - e) If you **<shift>+RightClick** on either the analog or digital pane of the OffLine Editing Window (anywhere but ON an analog or digital channel), the end of the selected range of time will snap to where you clicked.
  - f) The adjacent Clockface Shortcuts can be used to paste a time into the adjacent time setting, or copy the time from the adjacent entry into another time setting elsewhere in Pc•MACs.

### **Zoom the Analog Display Scale.....**

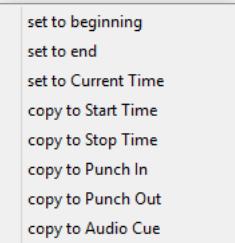
- V) Analog Values Display Out: This zooms the analog display pane outwards until it displays the analog values completely. This command is also available under the '[OffLine' menu.](#)
- W) Analog Values Display In: This zooms the analog display pane inwards. A scroll bar at the right of the analog pane allows it to be scrolled to so that you can see the entire analog value. This command is also available under the '[OffLine' menu.](#)

## Clock face Shortcuts.....

Located next to all the ‘time’ displays, these ‘shortcut’ buttons each pop up a small menu that allows you to quickly copy a value into the adjacent time display, or paste the adjacent time display into another time display.

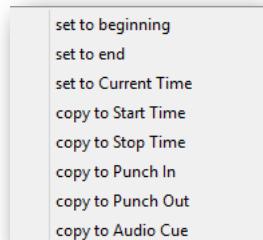
### X) Adjacent to the ‘Left of Window Time’ for the OffLine Editing Window:

- a) Set the ‘Left of Window Time’ to the beginning of the show (00:00:00.00)
- b) Set the ‘Left of Window Time’ to the end of the show
- c) Set the ‘Left of Window Time’ to the time shown on the Main Control Window. This is used if you stopped the show playback at some random point in the show, to instantly set the OffLine Editing Window to display that point in time.
- d) Copy the ‘Left of Window Time’ to the ‘Start Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker on the OffLine Editing Window.
- e) Copy the ‘Left of Window Time’ to the ‘Stop Time’ on the Main Control Window. This also moves the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- f) Copy the ‘Left of Window Time’ to the ‘Punch In’ time on the Main Control Window. This also moves the blue vertical ‘Punch In’ time marker on the OffLine Editing Window.
- g) Copy the ‘Left of Window Time’ to the ‘Punch Out’ time on the Main Control Window. This also moves the orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.
- h) Copy the ‘Left of Window Time’ to the ‘Audio Cue’ time on the Main Control Window.



### Y) Adjacent to the time ‘Start of Selected time’:

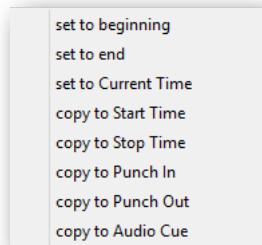
- a) Set the ‘Start of Selected time’ to the beginning of the show (00:00:00.00)
- b) Set the ‘Start of Selected time’ to the end of the show
- c) Set the ‘Start of Selected time’ to the time shown on the Main Control Window. This is used if you stopped the show playback at some random point in the show, to instantly set the OffLine Editing Window to display that point in time.



- d) Copy the ‘Start of Selected time’ to the ‘Start Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker on the OffLine Editing Window.
- e) Copy the ‘Start of Selected time’ to the ‘Stop Time’ on the Main Control Window. This also moves the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- f) Copy the ‘Start of Selected time’ to the ‘Punch In’ time on the Main Control Window. This also moves the blue vertical ‘Punch In’ time marker on the OffLine Editing Window.
- g) Copy the ‘Start of Selected time’ to the ‘Punch Out’ time on the Main Control Window. This also moves the orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.
- h) Copy the ‘Start of Selected time’ to the ‘Audio Cue’ time on the Main Control Window.

Z) Adjacent to the time ‘End of Selected time’:

- a) Set the ‘End of Selected time’ to the beginning of the show (00:00:00.00)
- b) Set the ‘End of Selected time’ to the end of the show
- c) Set the ‘End of Selected time’ to the time shown on the Main Control Window. This is used if you stopped the show playback at some random point in the show, to instantly set the OffLine Editing Window to display that point in time.
- d) Copy the ‘End of Selected time’ to the ‘Start Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker on the OffLine Editing Window.
- e) Copy the ‘End of Selected time’ to the ‘Stop Time’ on the Main Control Window. This also moves the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- f) Copy the ‘End of Selected time’ to the ‘Punch In’ time on the Main Control Window. This also moves the blue vertical ‘Punch In’ time marker on the OffLine Editing Window.
- g) Copy the ‘End of Selected time’ to the ‘Punch Out’ time on the Main Control Window. This also moves the orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.



- h) Copy the ‘End of Selected time’ to the ‘Audio Cue’ time on the Main Control Window.

AA) Adjacent to the ‘Center of Window Time’ for the OffLine Editing Window:

- a) Set the ‘Center of Window Time’ to the beginning of the show (00:00:00.00)
- b) Set the ‘Center of Window Time’ to the end of the show
- c) Set the ‘Center of Window Time’ to the time shown on the Main Control Window. This is used if you stopped the show playback at some random point in the show, to instantly set the OffLine Editing Window to display that point in time.
- d) Copy the ‘Center of Window Time’ to the ‘Start Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker on the OffLine Editing Window.
- e) Copy the ‘Center of Window Time’ to the ‘Stop Time’ on the Main Control Window. This also moves the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- f) Copy the ‘Center of Window Time’ to the ‘Punch In’ time on the Main Control Window. This also moves the blue vertical ‘Punch In’ time marker on the OffLine Editing Window.
- g) Copy the ‘Center of Window Time’ to the ‘Punch Out’ time on the Main Control Window. This also moves the orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.
- h) Copy the ‘Center of Window Time’ to the ‘Audio Cue’ time on the Main Control Window.

set to beginning  
set to end  
set to Current Time  
copy to Start Time  
copy to Stop Time  
copy to Punch In  
copy to Punch Out  
copy to Audio Cue

BB) Adjacent to the ‘Amount of Selected Time’ for the OffLine Editing Window, these three settings copy both the start and end of the selected time to the destinations:

copy to Start & End  
copy to Punch In & Out  
copy to Offline Start & End

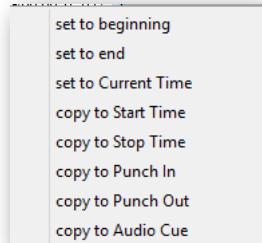
- a) Copy the ‘Start of Selected time’ to the ‘Start Time’ on the Main Control window and the ‘End of Selected time’ to the ‘Stop Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker and the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- b) Copy the ‘Start of Selected time’ to the ‘Punch In’ time on the Main Control Window and the ‘End of Selected time’ to the ‘Punch Out’ time on the Main

Control Window. This also moves the blue vertical ‘Punch In’ and orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.

- c) Zooms the OffLine Editing Window to the selected stretch of time.

CC) Adjacent to the ‘Right of Window Time’ for the OffLine Editing Window:

- a) Set the ‘Right of Window Time’ to the beginning of the show (00:00:00.00)
- b) Set the ‘Right of Window Time’ to the end of the show
- c) Set the ‘Right of Window Time’ to the time shown on the Main Control Window. This is used if you stopped the show playback at some random point in the show, to instantly set the OffLine Editing Window to display that point in time.
- d) Copy the ‘Right of Window Time’ to the ‘Start Time’ on the Main Control Window. This also moves the green vertical ‘Start Time’ marker on the OffLine Editing Window.
- e) Copy the ‘Right of Window Time’ to the ‘Stop Time’ on the Main Control Window. This also moves the red vertical ‘Stop Time’ marker on the OffLine Editing Window.
- f) Copy the ‘Right of Window Time’ to the ‘Punch In’ time on the Main Control Window. This also moves the blue vertical ‘Punch In’ time marker on the OffLine Editing Window.
- g) Copy the ‘Right of Window Time’ to the ‘Punch Out’ time on the Main Control Window. This also moves the orange vertical ‘Punch Out’ time marker on the OffLine Editing Window.
- h) Copy the ‘Right of Window Time’ to the ‘Audio Cue’ time on the Main Control Window.

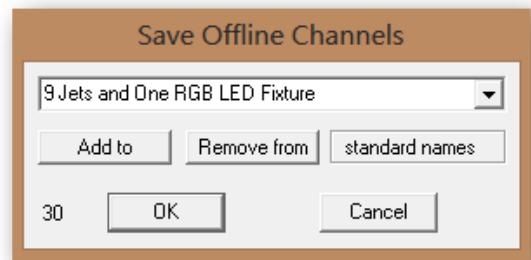


## OffLine Editing Window Presets.....

Once you have moved channels over to the OffLine Editing Window and sorted them into an order that you will be using more than once, you will want to save a OffLine Editing Window preset for your setup.

DD) This button is used to save new OffLine Editing Window presets. This command is also available under the '[OffLine](#)' menu.

The output channels currently on the OffLine Editing Window, as well as their sort order, will be saved as part of this new Preset. Pc•MACs will prompt you for a new name of this preset, and will warn you if it is already in use.



To modify an existing OffLine Editing Window preset, overwrite the existing preset using the identical preset name.

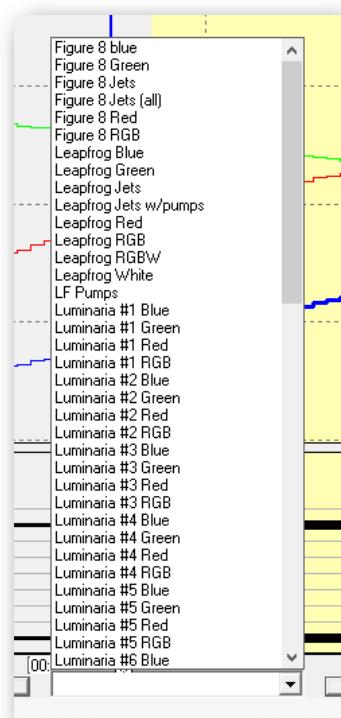
If you regularly use the same names for presets across multiple projects, you can build up a list of 'standard names' for OffLine Editing Window presets. If you have a name you want to use again later, just press the 'Add To' button. That name will now be available from this dialog's drop down across all of your GilderProjects. Instead of typing the name again, you hit the arrow at the right of the drop down to display all the 'standard names' you have previously saved, and pick the one you want to use.

To remove a name from the list of 'standard names', just pop it up, or type it in. When you press the 'Remove From' button, any name which matches the text in the drop down will be removed from the 'standard names' list.

EE) This drop-down is used to recall previously saved OffLine Editing Window presets. This command is also available under the '[OffLine](#)' menu.

If you just click on the arrow to open the drop down, the currently loaded preset will be highlighted in the list, and you can use the up/down arrow keys to select nearby presets.

If you hold down the <shift> button while requesting a saved preset, the output channels that are already on the OffLine Editing Window won't be removed before loading the new preset. This allows you to load multiple presets at the same time. The drop down label will show 'Multiple Presets' instead of a specific preset that is loaded.



To remove an OffLine Editing Window preset from the list of those available, there is a 'Delete OffLine Preset' command available under the '[OffLine](#)' menu. Select the preset(s) you no longer want to use and hit 'OK'.

## Selected Channels.....

This gets you back to the '[Move to OffLine...](#)' two column mover dialog, where you can move output channels on and off of the OffLine Editing Window if you aren't using presets.

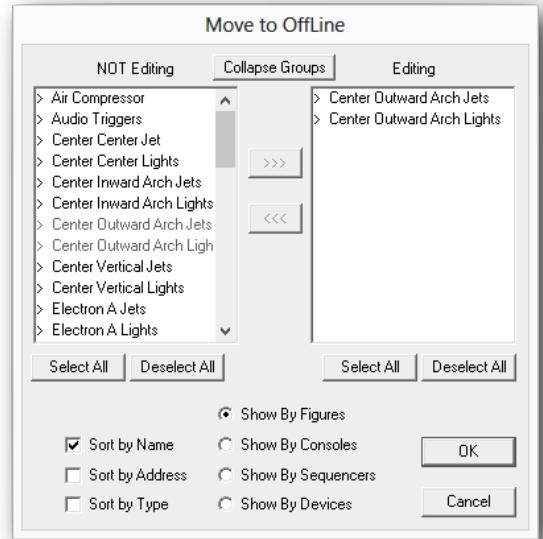
This dialog has two columns on it. In the left column are all the figures and channels you have created. In the right column are the channels you will be editing<sup>19</sup>.

You can also access the '[Move to OffLine...](#)' dialog if you have already opened the OffLine Editing Window by pressing the big 'Selected Channels' button at the bottom of the OffLine Editing Window.

On the '[Move to OffLine...](#)' dialog, your outputs can be shown and/or sorted by:

- a) The figures the movements have been assigned to.
- b) The Console Presets the movements have been assigned to.
- c) Alphabetically by the movement names.
- d) Numerically by the DMX-512 addresses assigned for the outputs.
- e) By Types. This segregates the analogs and digital functions, and sorts them separately using the criteria set above.

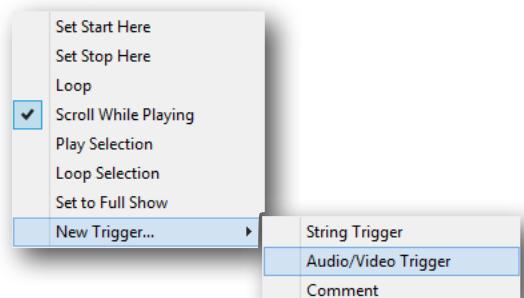
You can select whole figures, or just some of the channels for editing by highlighting them and either dragging them or pressing the 'Move' button between the two columns. Move a few analogs and a few digitals from the left column to the right column of the '[Move to OffLine...](#)' dialog. Press the 'OK' button when you are done. This will open the OffLine Editing Window (if it wasn't already opened).



<sup>19</sup> If you have assigned any analog or digital movements to a figure, you can 'open' up the figure by clicking on the '>'.

## OffLine Editing Window shortcut menu.....

RightClicking with your mouse on the OffLine Editing Window (avoid RightClicking on or near any analog or digital channels) will open a shortcut menu. This menu has even more shortcuts for you to use on the OffLine Editing Window:



- a) **Set Start Here:** Copies the point in time where you RightClicked to the 'Start Time' on the Main Control Window. This also moves the green vertical 'Start Time' marker on the OffLine Editing Window.
- b) **Set Stop Here:** Copies the point in time where you RightClicked to the 'Stop Time' on the Main Control Window. This also moves the red vertical 'Stop Time' marker on the OffLine Editing Window.
- c) **Loop:** This toggles the 'Loop' flag on the Main Control Window. The 'Loop' toggle can also be found under the '['Realtime' menu](#)'. When the show is started (Playing/Recording/Rehearsing) the show will start at the 'Start Time', and continue to the 'Stop Time'. If the 'Loop' checkbox is OFF, then the show will stop. If the 'Loop' checkbox is ON. Pc•MACs will start the show over at the 'Start Time', performing an Easeln at the loop if this option is enabled.
- d) **Scroll While Playing:** This enables/disables the automatic scrolling of the OffLine Editing Window as a show is played. With it off, the OffLine Editing Window does not scroll to follow the show. With it on, the OffLine Window will scroll to keep the frame being played at the center of the window.

This command is also available under the '['OffLine' menu](#)'. There is also an option under the '['OffLine' menu](#)' to use smooth scrolling or not. If it is off, then the OffLine Window will scroll, but by snapping forward a screen width at a time. This can help if your computer too underpowered to scroll smoothly.

- e) **Play Selection:** Clears the 'Loop' toggle, and copies the 'Start of Selected time' to the 'Start Time' on the Main Control window and the 'End of Selected time' to the 'Stop Time' on the Main Control Window. This also moves the green vertical 'Start Time' marker and the red vertical 'Stop Time' marker on the OffLine Editing Window.

This command is also available under using the Clockface Shortcut adjacent to the amount of time selected.

- f) **Loop Selection:** Sets the 'Loop' toggle, and copies the 'Start of Selected time' to the 'Start Time' on the Main Control window and the 'End of Selected

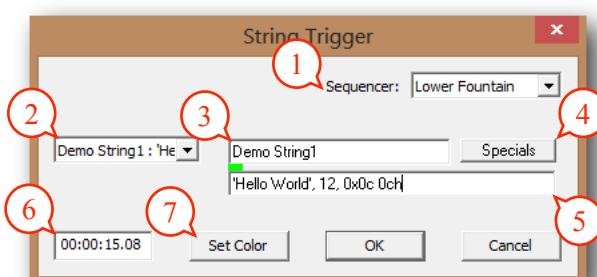
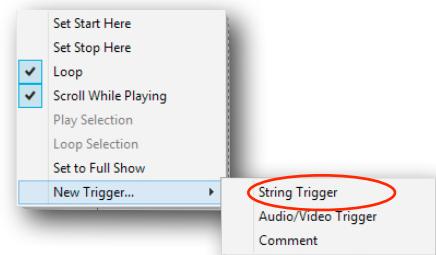
time' to the 'Stop Time' on the Main Control Window. This also moves the green vertical 'Start Time' marker and the red vertical 'Stop Time' marker on the OffLine Editing Window.

- g) **Set to full Show:** This instantly sets the 'Start Time' on the Main Control window to the beginning of the show (00:00:00.00) and the 'Stop Time' to the end of the show on the Main Control Window. This also moves the green vertical 'Start Time' marker and the red vertical 'Stop Time' marker on the OffLine Editing Window.
- h) **New Trigger:** See next section....

## Adding Drag-n-Drop Triggers to Your Timeline.....

You can add drag-n-Drop marker to your show by simply RightClicking with your mouse on the OffLine Editing Window (avoid RightClicking near any analog or digital channels). This will open a shortcut menu. If you mouse down to the 'Add Marker...', you can slide to the right to select whether you want to add:

- A) **A 'String' Marker:** This allows you to send serial strings to control other devices from your show's timeline. You can set the baud rate and protocol (MIDI or Sony 9-Pin) by opening the 'settings' for the output device which will actually send the string out. Currently this feature is only supported by the Br-Brain4 through its secondary serial port.

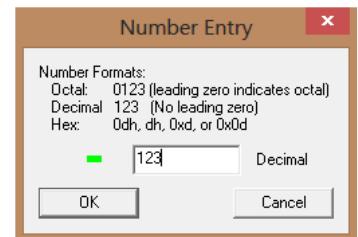


1) If your project uses multiple sequencers, different strings can be sent by each sequencer. This is where you tell Pc•MACs which sequencer this string is to be sent by.

2) Any strings you have already defined for this site are available for reuse using this drop-down. If you are using an already-defined string, the name and content of the string are automatically filled in. If you modify the content of an existing string without renaming it, then the new content will replace the stored content, but not any instances of the string that have already been used.

- 3) The unique name for each string is entered here.

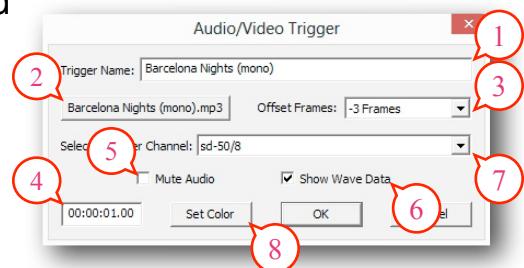
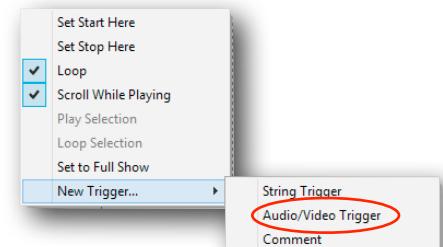
- 4) The ‘Specials’ button allows you to enter several commonly needed string values, as well as several ‘special’ markers for your strings:
- a) Restore: This clears out everything from the string entry field.
  - b) String: You can enter an ascii string here. When you click ‘OK’, single quote marks are added and the text is moved to the string entry field.
  - c) Numeric Values: This gives examples of decimal, hex and octal numeric values. You can enter a decimal value here. A green light indicates that your number is formatted properly.
  - d) Make Pretty: This attempts to clean up a string that is not properly formatted.
  - e) Return: Inserts a <Carriage Return> character = 0x0d.
  - f) Line Feed: Inserts a <Line Feed> character = 0x0A.
  - g) Return/LineFeed: Inserts both a <Carriage Return> and <Line Feed> = 0x0D 0x0A.
  - h) Get Anything: This is used when you need to get a character back from the serial port, but don’t care what the value of that character is.
  - i) Talk All & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through all eight ports, and listen to only the first port. The Br-SDC8 stays in this mode until another MUX command is received.
  - j) Talk & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 1. The Br-SDC8 stays in this mode until another MUX command is received.
  - k) Talk & Listen 2: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 2. The Br-SDC8 stays in this mode until another MUX command is received.
  - l) Talk & Listen 3: This is MUX command used with the Br-SDC8 to send the following serial data out through port 3, and listen to only returned data through port 3. The Br-SDC8 stays in this mode until another MUX command is received.



- m) Talk & Listen 4: This is MUX command used with the Br-SDC8 to send the following serial data out through port 4, and listen to only returned data through port 4. The Br-SDC8 stays in this mode until another MUX command is received.
  - n) Talk & Listen 5: This is MUX command used with the Br-SDC8 to send the following serial data out through port 5, and listen to only returned data through port 5. The Br-SDC8 stays in this mode until another MUX command is received.
  - o) Talk & Listen 6: This is MUX command used with the Br-SDC8 to send the following serial data out through port 6, and listen to only returned data through port 6. The Br-SDC8 stays in this mode until another MUX command is received.
  - p) Talk & Listen 7: This is MUX command used with the Br-SDC8 to send the following serial data out through port 7, and listen to only returned data through port 7. The Br-SDC8 stays in this mode until another MUX command is received.
  - q) Talk & Listen 8: This is MUX command used with the Br-SDC8 to send the following serial data out through port 8, and listen to only returned data through port 8. The Br-SDC8 stays in this mode until another MUX command is received.
- 5) This is where you enter your string. Entries can be separated by spaces, a comma, or a comma and spaces. If the string is entered correctly, a green light will appear above this field.
- a) Ascii strings should be enclosed within single or double quotes.
  - b) Decimal values can be between any number of digits, as long as the value is between zero and 255.
  - c) Hexadecimal numbers can be entered as dh, 0dh, 0xd or 0x0d.
  - d) For old timers, octal values are entered as four digits with the leading digit a zero, the second digit 0-3, and the remaining two digits 0-7.
- 6) This is the time where you dropped the marker. You can modify the time, or just LeftClick on the name of the string on the OffLine Editing Window, and drag it around as needed.
- 7) Set Color: You can set what color is used for the trigger's name on the OffLine Editing Window.

**B) An Audio/Video Trigger:** This is the preferred method of adding audio and video files to a show, rather than using the audio/video 'sync' on the 'File' menu's 'Show Information....' dialog. If there are multiple, overlapping audio triggers in your show, the audio can be mixed together, or individual tracks can be muted as needed. When picking your SoundFiles or VideoFiles, Pc•MACs will filter so that you will only see the appropriate type of files on the file open dialog. You can pop open the 'file type', and select between SoundFiles, VideoFiles or 'all files' to display.

- 1) Trigger Name: By default this will be loaded with the name of the Audio/Video file that you chose. You can then change it into any text you prefer.
- 2) Press this button to choose your Audio/Video file. The file extensions will filter for either audio or video files, depending on what type of device is selected for selected playback device.
- 3) Audio Offset. While you are programming your show, you will typically be listening to the sound from your computer. If you begin playback before this trigger (after you have done an AutoDownload and moved the Audio/Video files to the player), you will also hear it from the Audio/Video player. If they are not perfectly in sync, use this drop-down to adjust the playback until it sounds like just one source is playing. This indicates that the sync is perfect.
- 4) This is the time where you dropped the marker. You can modify the time, or just LeftClick on the name of the string on the OffLine Editing Window, and drag it around as needed.
- 5) Mute Audio: If this is checked, then the Audio/Video will not play back on your computer. Use this to isolate individual tracks for programming, or to keep from over stressing your PC by playing back too many Audio/Video files.
- 6) Show Wave Data: Only one Audio/Video track can have its waveform displayed in back of the analog pane of the OffLine Editing Window.
- 7) Audio/Video player: If you have more than one Audio/Video player, you select which one this trigger is targeted to.



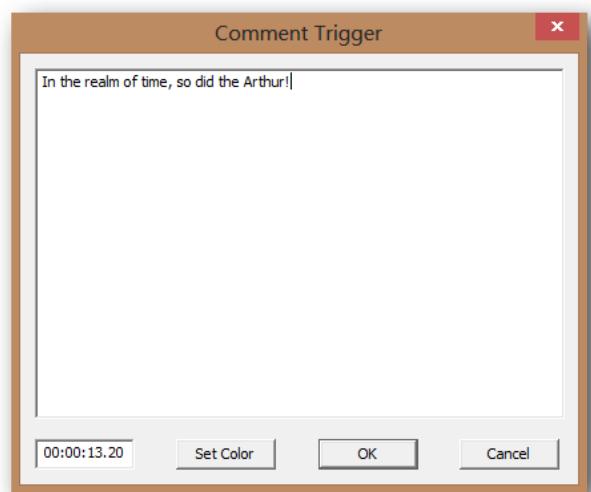
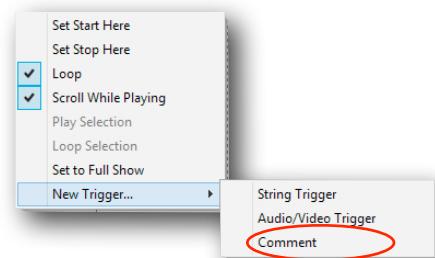
8) Set Color: You can set what color is used for the trigger's name on the OffLine Editing Window.

Pc•MACs can use any audio or video file that the Windows Media player can play. This includes most of the common audio file types. Unless you have downloaded additional 'codecs', you will not be able to open h.264 (.Mp4, .m4v) files, which is the most popular type of Video File, but are not owned by Microsoft.

Most modern video compression standards only store 'key' frames every half dozen or so frames. This will cause the video not to update on every frame when single stepping on the OffLine Editing Window. Also a high resolution video playback will likely fill your whole PC's screen, and decompressing it may monopolize the PC's processor. A lower resolution (around 240 to 320 lines) works well. Although you may use a high resolution h.264 or h.265 compressed file for your final video, using a .WMV or .AVI file during programming will show you every frame of the video when you are using the OffLine Editing Window single stepping functions.

- C) A 'comment' marker: This allows you to add notes in your show's timeline. These can be dialog from your show's script, or simply notes to yourself. You paste or type in whatever text you want to see. You can set the point in time and the color of the marker. The name of the marker will be the first bit of text in the comment.

You can reopen any drag-n-drop marker by double clicking on it, or LeftClicking on the marker and dropping down the shortcut menu and selecting 'edit...'. The shortcut menu also allows you to show or minimize the marker's name. If the marker is an Audio/Video trigger, you can also select whether the Audio/Video waveform is shown on the OffLine Editing Window (only one waveform can be visible at one time), and whether the audio is muted/video is displayed (only one active video window is allowed at one time).



## Right Mouse Button Editing Commands

The commands that don't appear on any menu in Pc•MACs, so they aren't dead obvious on the OffLine Editing Window are those that use the right mouse button:

### Drawing Digitals with a right mouse click.....

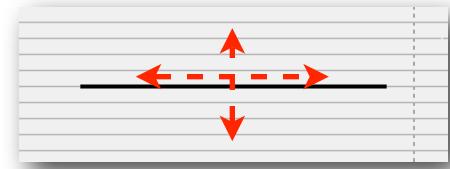
You can draw (shown at left) or undraw (shown at right) any digital function by RightClicking on it and sliding the mouse left or right. If you start on a point where the digital function is 'Off' (only a thin line is showing), it will be drawn in. If you click on a spot where the digital is 'On' (where the line is already fat), it will be



turned 'Off' as you RightClick and drag the mouse left or right.

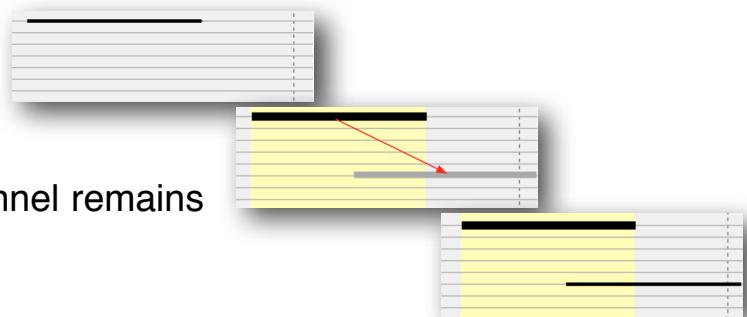
### Moving digitals with a <shift>+right mouse click.....

If you press down the <shift> on your keyboard and RightClick on a digital, you can then 'shift' it left or right in time, or up and down to another channel without changing its length.



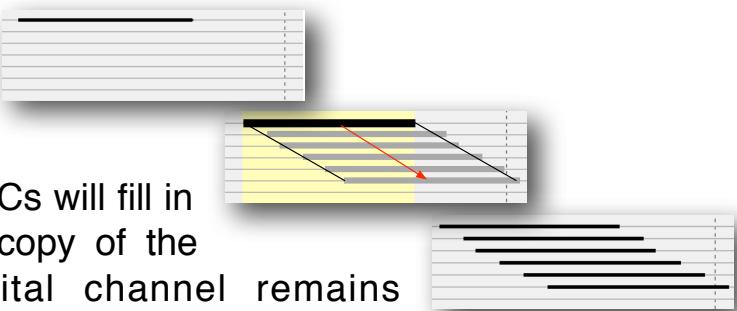
### Duplicating digitals with a <Control>+right mouse click.....

If you press the <Control> key on your keyboard and RightClick on a digital, you can then drag it to another output channel and it will be copied there. The original digital channel remains unchanged.



## Making a Chase with a <shift>+<Control>+right mouse click.....

If you press both the <Control> key and <Shift> key on your keyboard and RightClick on a digital, you can then drag a digital it to another output channel and Pc•MACs will fill in all the intervening channels with a copy of the original digital. The original digital channel remains unchanged. This is a quick way to make a ‘chase’ pattern across any number of digital channels.

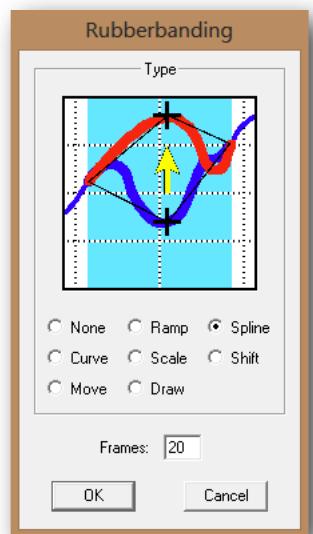


## Modifying analogs with a right mouse click.....

The tools that are used to ‘mush’ analog channels around are called the ‘Rubberbanding’ tools. This is because Pc•MACs allows you to stretch and modify the analog waveforms just as easily as you can with a rubber band. The settings for the Rubberbanding tools can be found under the [‘Preferences’ menu’s](#) Rubberbanding dialog.

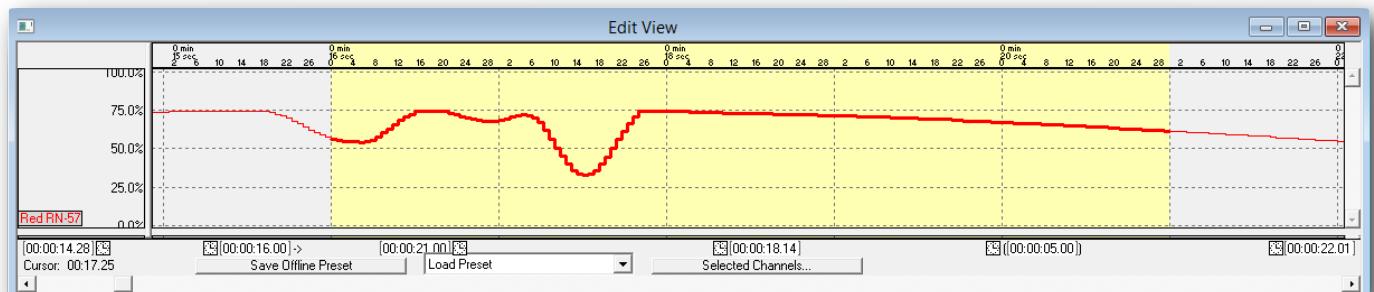
Move the mouse over an analog function. RightClick on it and slide the mouse up or down. When you release the button, the wave shape will be modified. If a range of time has been selected, then that area will be Rubberbanded (instead of the default selection you made for twenty frames).

Spline is the most commonly used tool. It matches the edited analog to the data before and after the edit area.



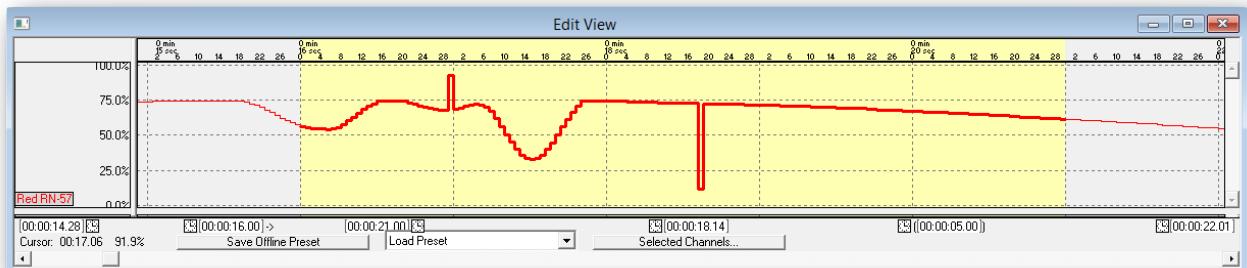
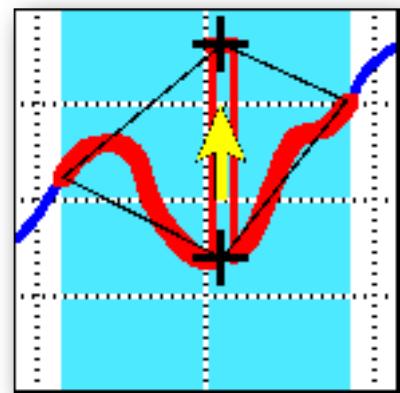
You can go to the [‘Preferences’ menu’s](#) Rubberbanding.... dialog and try out some of the other tools. The drawing that accompanies each tool shows graphically what it does. Only the ‘Pencil’ tool requires that a range of time be selected on the OffLine Editing Window for it to work.

All the following Rubberbanding samples start with this waveform:

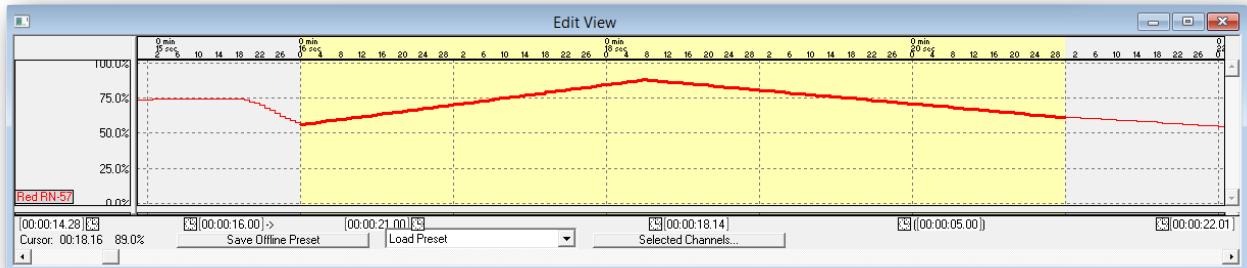
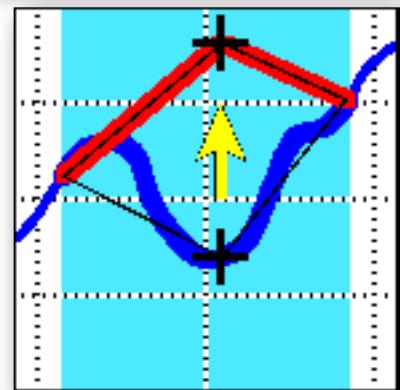


The different curves available to you for rubberbanding are:

- a) **None:** This is used when you just want to move the one point you select to a new value. This is the only Rubberbanding tool that doesn't care if you select a range of time or not. In either case, the one frame you clicked on can be pulled up or down as needed. No other data will be changed. This is a good way to add sharp bumps in the motion profile. This can also be used for triggering strobe lights or other lighting effects where you don't want the channel to ramp.

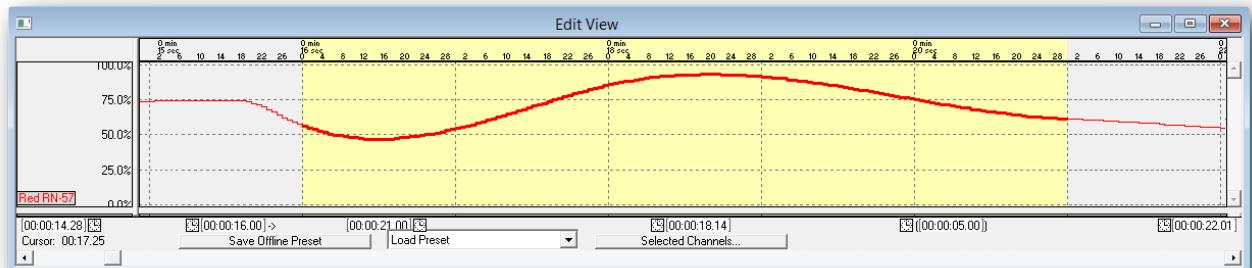
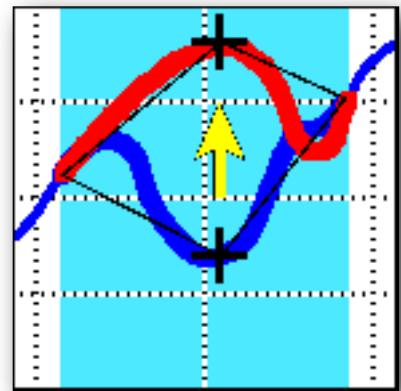


- b) **Ramp:** This generates a dead straight line between each of the points. It is the most basic type of ramping available. The left and right ends are anchored at the edges of the selected area (or the default number of frames, if a stretch of time hasn't been selected). The center point is wherever you released the right mouse button. The 'linear' curve draws only straight lines between points. This tends to make whatever the system is controlling look somewhat 'robotic'. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn't give the movements the subtlety that it takes to make a show look like it is

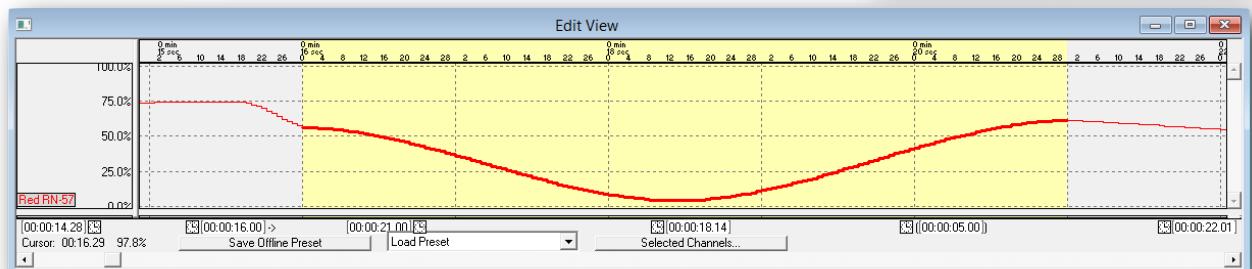
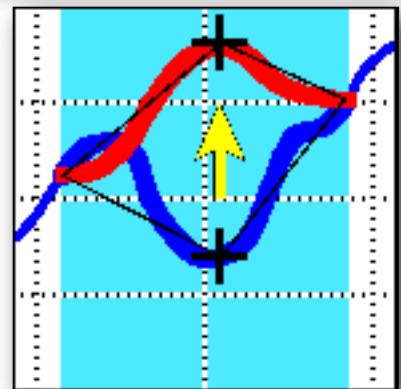


truly ‘alive’.

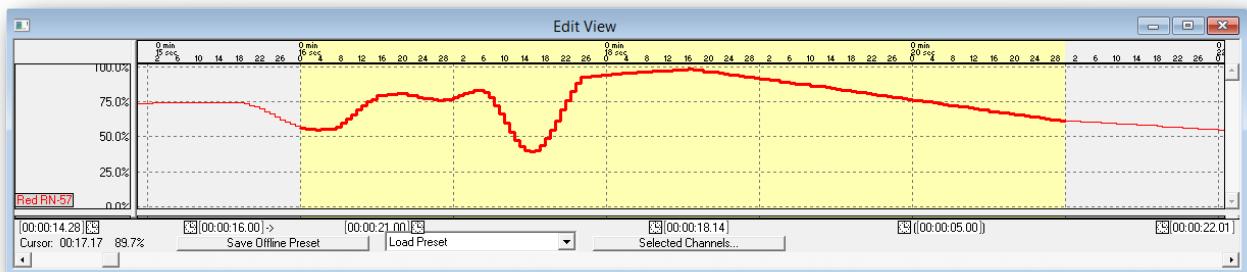
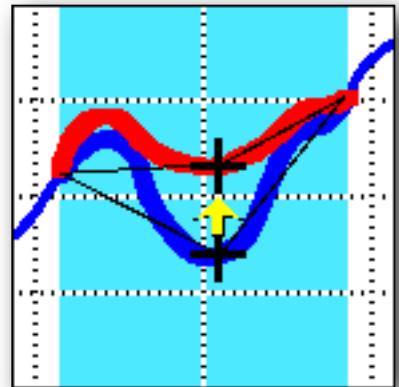
- c) **Spline:** This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the area of the edit. Because the ‘Spline’ is looking to match the data outside of the edit area, if this move has too high of a velocity (the angle of the line is acute), the spline may overshoot and hit zero or 100%. To avoid this, you may need to make some adjustments to the curve or to do your ‘spline’ over a few shorter distances, rather than one long stretch of time.



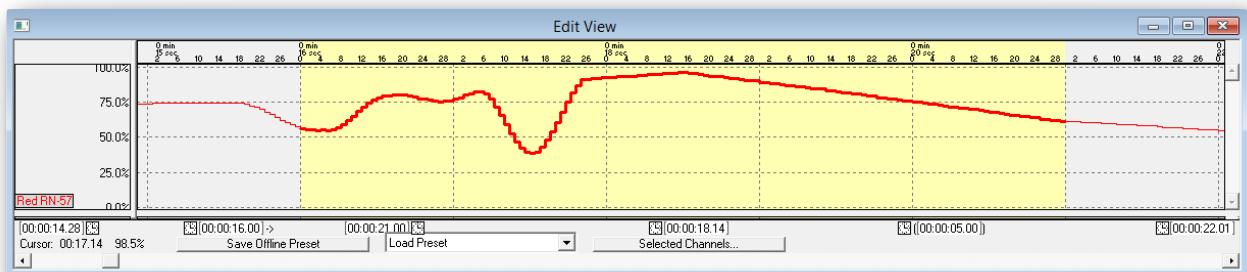
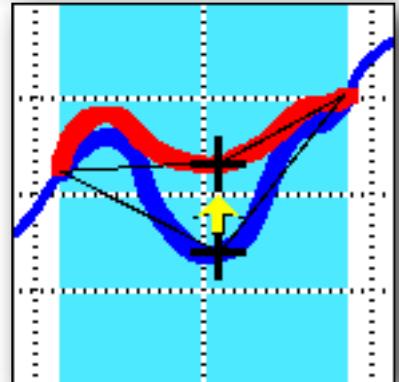
- d) **Curve:** Like the Spline above, except that it doesn’t match the data before and after the effected area. The start and end of the edit is always at zero velocity (the lines are level). This results in a simple ‘S’ curve.



- e) **Scale:** This setting expands a movement as you move the cursor further away from default position for the channel. The amplitude of the movements is increased as they move away from the default position while those near the default position remains unchanged. This allows movements to be made more ‘exaggerated’ without changing the movements near the default position. The effect of this command it virtually zero at the ends of the edit, and increase to the peak where you release the right mouse button to complete the edit. Another version of this editing tool is available under the [‘Edit’ menu’s Scale command.](#)

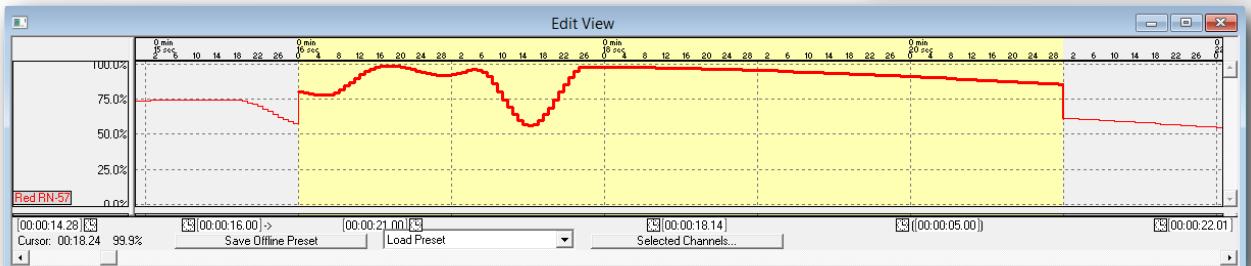
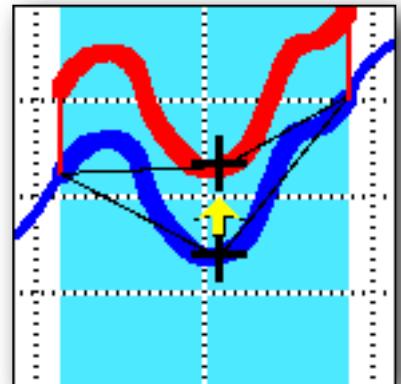


- f) **Shift:** This setting moves the analog movement in the direction you move the mouse without effecting the amplitude of the movements. This is as if the movements were drawn along the road surface of a drawbridge. As you move the mouse up or down, the center of the bridge raises and lowers at the mouse point without effecting the amplitude of the data. The data at the hinge points at both ends of the edit area are barely changed. Another version of this editing tool is

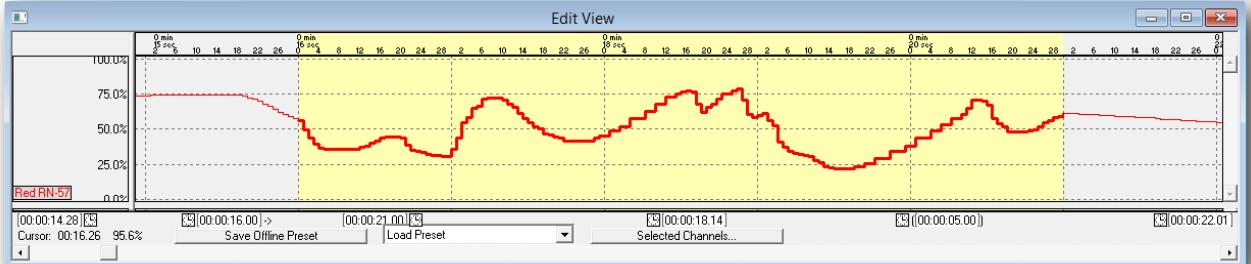
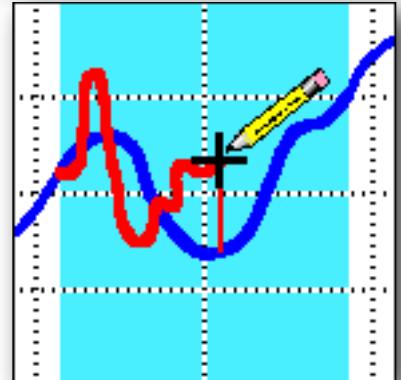


available under the [‘Edit’ menu’s Shift command.](#)

**g) Move:** This setting allows you to move the entire selected area up or down with the mouse. This puts your data onto the type of drawbridge where the moving deck raises and lowers horizontally. No attempt is made to match the endpoints of the edit with the data outside of the edit area. As long as the data doesn't hit zero or 100%, the waveform will not be altered.



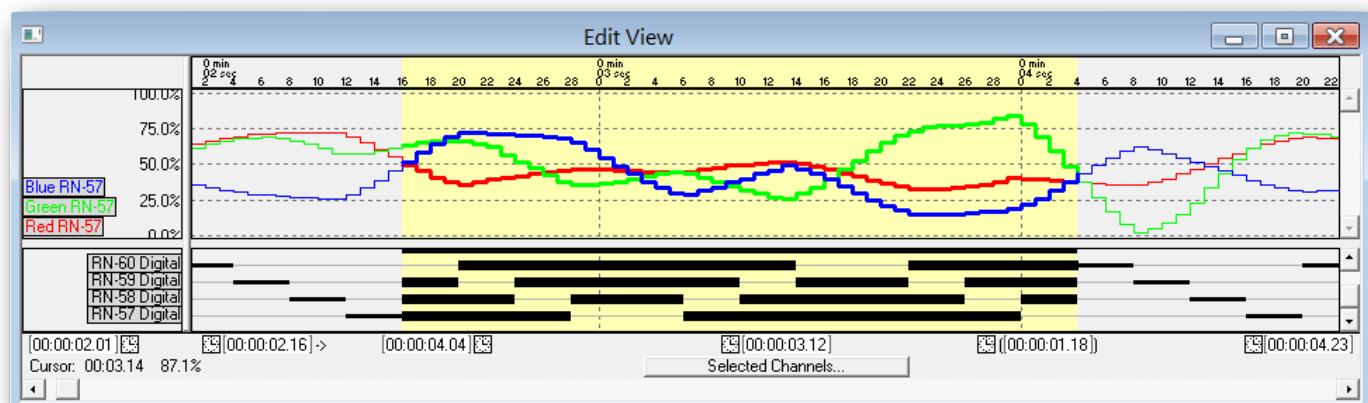
**h) Draw:** This is literally a ‘pencil’ tool. This setting allows you to ‘draw’ an analog waveform using the mouse. It is especially useful for ‘drawing’ in flickering light patterns, cleaning up mouth movements in animatronic figures or for particularly oddly shaped fade ins/out. The area of the edit must be selected before you start to draw using the ‘pencil’ tool.



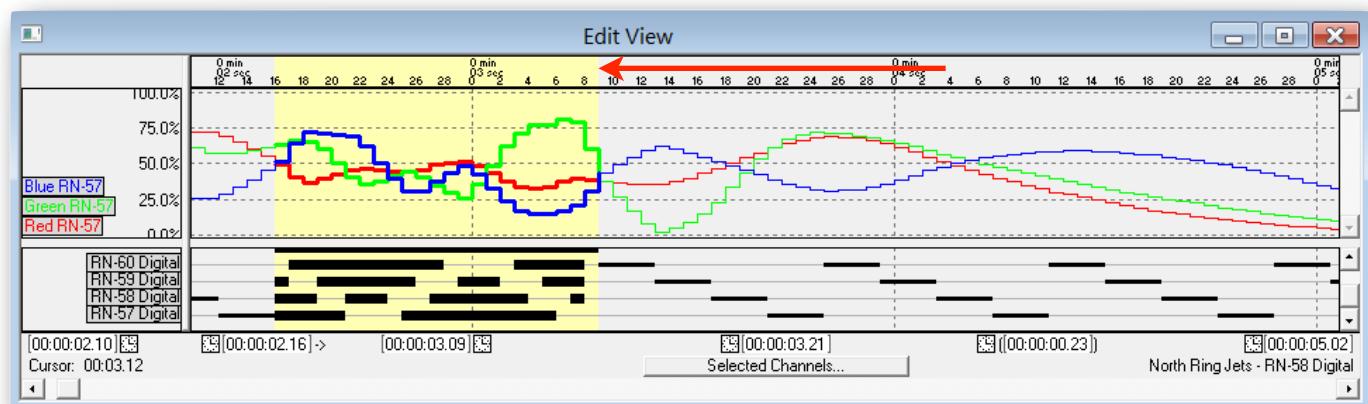
## Time Stretch and Compression:

You can freely stretch or compress programmed data on the OffLine Editing Window to speed up or slow down the time it takes for the selected stretch of time to complete. This can be used to move actions into line with a Audio/Video file, or to correct mouth movements on an animatronic figure.

If you save a Macro with a particularly nice set of movements in it, you can paste it into a different show. Once it is inserted, you can stretch or compress it to match the tempo needed in the new show. Starting with this illustration:

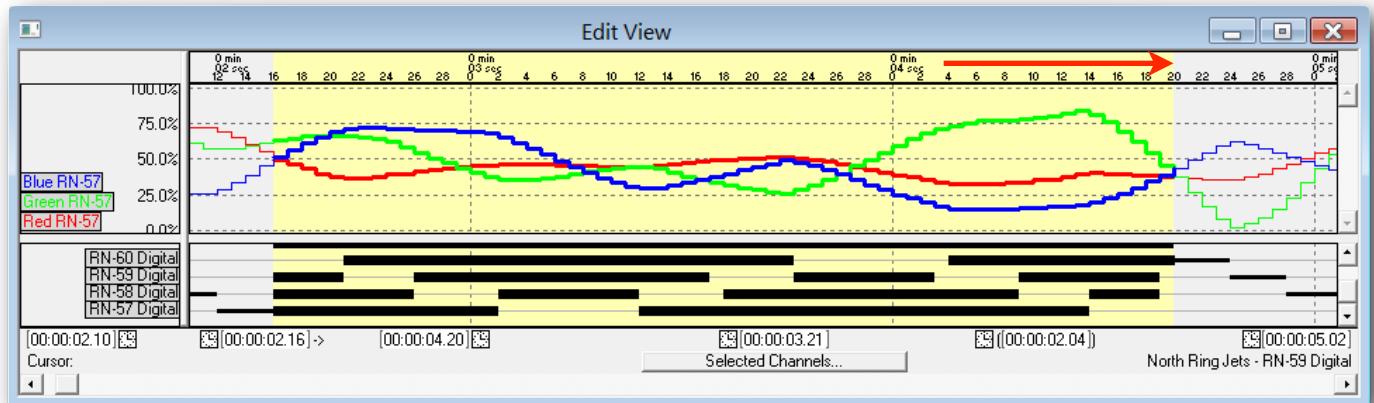


With one or more channel selected, you can then change the amount of time it takes for the movement to take place. To do this, move the cursor up into the time bar. As you do, you will see the cursor change into an 'I' beam. If you RightClick on the right end of the selected area and slide the mouse to the left, the selected channels will be compressed when you release the button. The data that used to occupy 48 frames is now compressed to just 23 frames. The data after the edit will slide forward in time to make room for your changes:

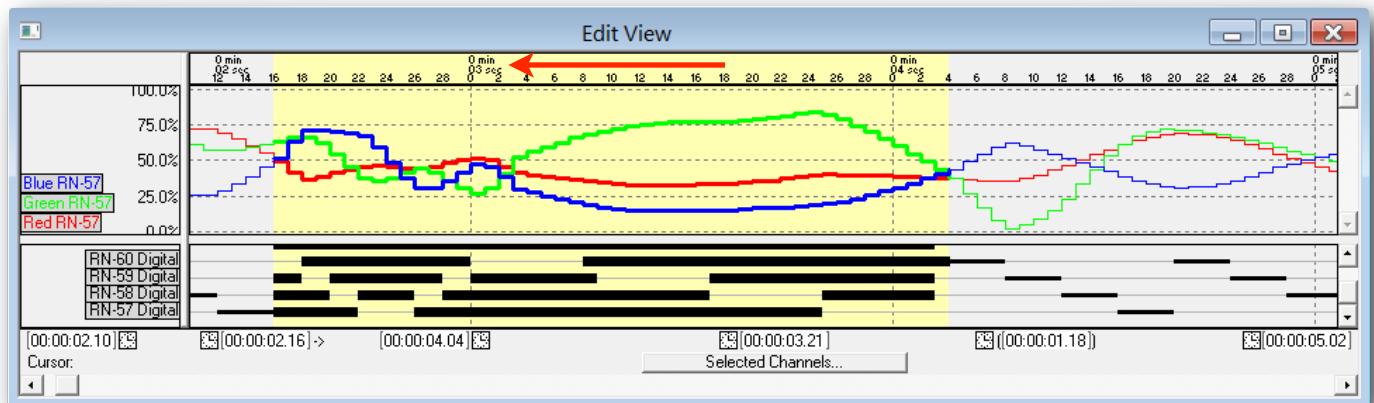


If you RightClick on the right end of the selected area and slide the mouse to the right, the data will be stretched. The data that used to occupy 48 frames is

now stretched to 64 frames. The data after the edit will slide backwards in time to make room for your changes:



If you RightClick somewhere in the middle of the selected area of time, you can slide left or right. The side you slide towards will be compressed while the data on the other side of the selected point will be stretched. In this case the mouse was slid towards the left, so the left side of the selected time was compressed, and the right stretched. Data outside of the selected area remains unchanged:



Analog functions are interpolated when you stretch or compress them, so they come out fairly cleanly. There aren't a lot of points between 'On' and 'Off' on a digital function, so you may see some rounding errors when compressing/stretching digital functions. You can minimize this by changing the new time to an even multiple of the original time.

If you need to speed up or slow down your entire show, just change the overall length of the show on the '[File](#)' menu's Show Info.... dialog. When you close the dialog, Pc•MACs asks if you would like the data stretched or compressed to match the new length. Answer 'yes'.

## Show/Hide the OffLine Editing Window [F8]

This command is used to open the OffLine Editing Window if it wasn't opened already, or hide it if it was. The OffLine Editing Window is where all the animation editing functions are located in Pc•MACs. If the show is synchronized to a AudioFile/VideoFile, the first time this window is opened there will be a delay while Pc•MACs evaluates the sound for displaying.

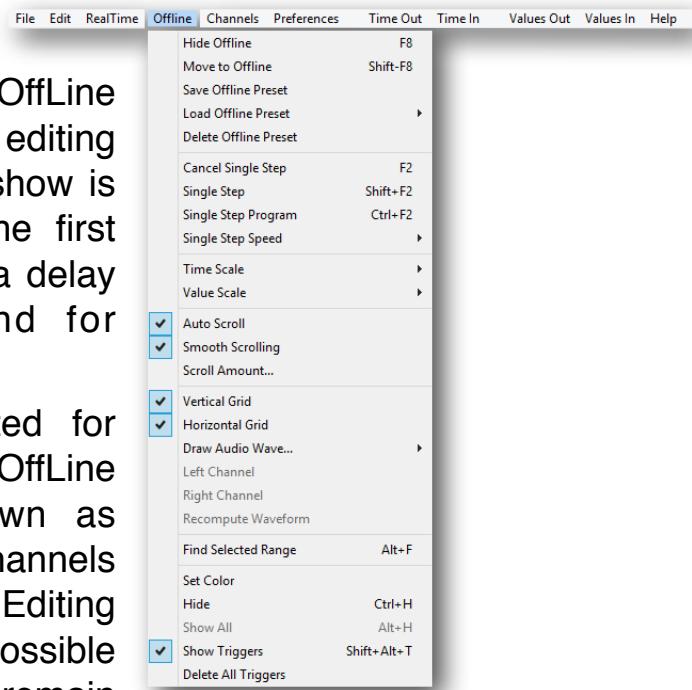
Any analogs that have been selected for display appear in the top pane of the OffLine Editing Window. The digitals are shown as horizontal bars along the bottom. Only channels which have been displayed on the OffLine Editing Window will be effected by any of the possible editing commands. All other channels will remain unchanged.

To identify a channel on the OffLine Editing Window, just move the cursor over it. The name of the channel (and the color it is displayed in) will then appear in the lower right corner of the screen.

LeftClicking on the 'time slider' arrows or the keyboard's left and right arrows will increment by the time set on the ['Preferences' menu's](#) Scroll Time. Usually this is set to one frame. Clicking on the gray area of the time slider will increment time displayed by about a screen worth of time. The exact amount of time it jumps depends on the screen resolution and the size of the window on your screen. If you LeftClick on the box in the time slider and slide it to the left or right you can move the screen instantly to any point in your show.

The times at the bottom of the screen show:

- the left-most frame being displayed on the screen
- the selection range
- the time at the center of the screen
- the amount of time selected
- the right-most frame being displayed on the screen



These times can be modified by scrolling the screen using the ‘time slider’ or making selections on the screen, or you can select any of them and change the value by:

- a) clicking on the left mouse button increments a value
- b) clicking on the right mouse button decrements a value
- c) sliding the mouse upwards increments the value
- d) sliding the mouse downwards decrements the value
- e) entering in the value using the numeric keys on your keyboard
- f) clicking on the small clock face next to each time brings up a drop-down menu:

This allows you to copy a time from another source or paste this time into another destination.

To select all of the analog and digital functions for editing, click anywhere but on one of them and slide the mouse to the left or right before releasing the mouse button. All of the displayed channels will be selected for the amount of time you select. To select a specific digital or analog function to edit, LeftClick on it and slide the mouse to the left or right before you release the mouse button. If you then want to change the amount of time selected, you can edit the times in the Info bar at the bottom of the screen or  $\langle\text{Shift}\rangle+\text{LeftClick}$  anywhere else in the window.

If you want to select or deselect any additional outputs, just momentarily  $\langle\text{shift}\rangle+\text{LeftClick}$  on them. To see a list of all the channels which are currently selected, just press the ‘Selected Channels’ button which appears at the bottom of the window. The '[Move to OffLine...](#)' dialog will pop up. Any ‘selected’ channels will be shown ‘highlighted’. You can use the standard  $\langle\text{shift}+\text{LeftClick}\rangle$  and  $\langle\text{control}+\text{LeftClick}\rangle$  to select the specific channels you want to edit and/or '[Move to OffLine...](#)' ( $\langle\text{shift}\rangle+\text{F8}$ )

This command brings up a dialog where you can select any analog or digital outputs for display and editing on the OffLine Editing Window.

The dialog has two columns in it. All the channels that have been assigned appear in the left column sorted by:

- a) The figures the movements have been assigned to.
- b) The Console Presets the movements have been assigned to.
- c) Alphabetically by the movement names.

- d) Numerically by the addresses assigned for the outputs.
- e) By Types. This segregates the analogs and digital functions, and sorts them separately using the criteria set above.

To display a channel on the OffLine Editing Window all you need to do is select it in the left column and move it to the right ‘Editing’ column. When analog channels are first displayed, a ‘default’ color will be assigned to them. If this color is not to your liking, you can change it by selecting the channel in the OffLine Editing Window and using the Set Color Command.

The '[Move to OffLine...](#)' dialog can be opened by pressing the Selected Channels button at the bottom of the OffLine Editing Window. Any ‘selected’ channels will be shown ‘highlighted’. You can use the standard `<shift+LeftClick>` and `<control+LeftClick>` to select the specific channels you want to edit.

## Save Offline Preset...

This button is used to save new OffLine Editing Window presets. This command is also available under the '[OffLine](#)' menu.

The output channels currently on the OffLine Editing Window, as well as their sort order, will be saved as part of this new Preset. Pc•MACs will prompt you for a new name of this preset, and will warn you if it is already in use.

To modify an existing OffLine Editing Window preset, overwrite the existing preset using the identical preset name.

If you regularly use the same names for presets across multiple projects, you can build up a list of ‘standard names’ for OffLine Editing Window presets. If you have a name you want to use again later, just press the ‘Add To’ button. That name will now be available from this dialog’s drop down across all of your GilderProjects. Instead of typing the name again, you hit the arrow at the right of the drop down to display all the ‘standard names’ you have previously saved, and pick the one you want to use.

To remove a name from the list of ‘standard names’, just pop it up, or type it in. When you press the ‘Remove From’ button, any name which matches the text in the drop down will be removed from the ‘standard names’ list.

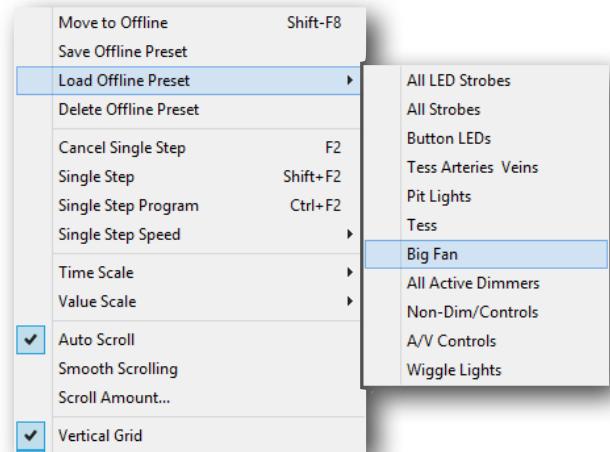


## Load Offline Preset

This drop-down is used to recall previously saved OffLine Editing Window presets. This command is also available under the '[OffLine](#)' menu.

If you just click on the arrow to open the drop down, the currently loaded preset will be highlighted in the list, and you can use the up/down arrow keys to select nearby presets.

If you hold down the <shift> button while requesting a saved preset, the output channels that are already on the OffLine Editing Window won't be removed before loading the new preset. This allows you to load multiple presets at the same time. The drop down label will show 'Multiple Presets' instead of a specific preset that is loaded.



## Delete Offline Preset...

To remove an OffLine Editing Window preset from the list of those available, there is a 'Delete Offline Preset' command available under the '[OffLine](#)' menu. Select the preset(s) you no longer want to use and hit 'OK'.



## Cancel Single Step (<F2>)

This command is a quick way of canceling any and all active Single Step Modes.

## Single Step Mode (<shift>+[F2])

This toggle turns 'On' and 'Off' the 'Single Step' mode. Turning 'Single Step' mode 'On' forces 'Off' 'Manual' mode. When 'Single Step' mode is 'On', whatever data appears at the center frame on the OffLine Editing Window will be sent to the animation system outputs. You can then use the arrow keys and time slider to step the show data forward and back anywhere from one frame to the entire length of the show. If the step is longer than a single frame, then the rate at which the show will be played is set by the '[Preferences](#)' menu's Single Step Speed. You can cancel out of a long single step sequence like this by pressing the <space bar> at any time. If you need to get to another part of the show without stepping through all the intervening

frames, you can hold down the <Shift> key on the keyboard while you move to the new location. This temporarily disables 'Single Step' mode so you can quickly get to another part of the show without single stepping all the way there.

## Single Step Program Mode (<control>+[F2])

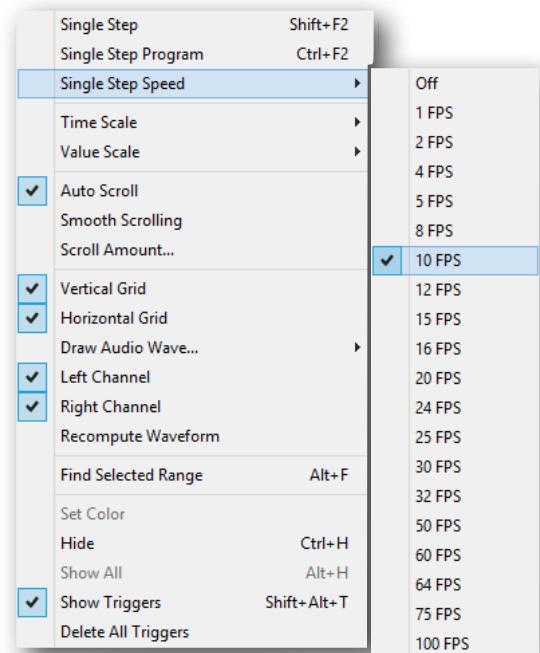
This toggle turns 'On' and 'Off' the 'Single Step Program' mode.

This works just like the normal 'Single Step' mode except that if there is anything assigned on the Pc•MACs Programming Console, it will be sent to the Animation System outputs. If any of the assigned channels are currently being displayed on the screen, they will move as the inputs change. Any single step commands that move forward in time will be recorded into the show. This allows you to program at any speed from single step up to one hundred frames per second. Data is not recorded when single stepping backwards in time.

## Single Step Speed

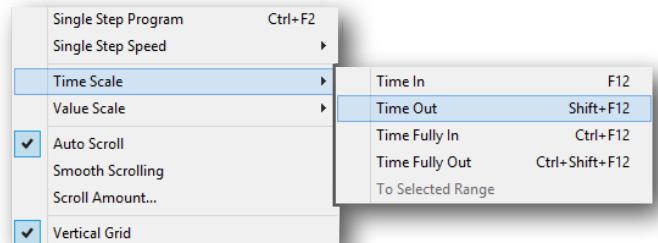
This command allows you to select what frame rate will be used for any single steps under the OffLine Editing Window. If 'Off' is selected, then the normal frame rate for the show will be used. Single stepping allows you to run a show at any lower (or higher, if you are feeling suicidal) frame rate than the show is normally run. Running at a lower speed makes it easy to watch your show to make sure that the figures have been kept 'in balance' or to look for any jumps or errors.

Frame rates higher than thirty fames per second are not recommended, as not all channels (or the checksum) will be transmitted through the DMX-512 output.



## Time Scale

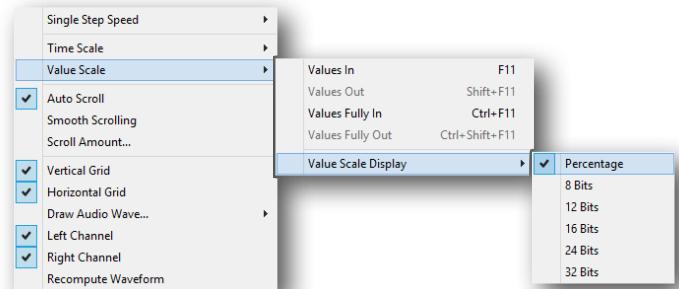
These commands are used to select how much of the show is displayed on the OffLine Editing Window at a time. You can zoom in to show just a few frames, or zoom all the way out to show the entire show. The options are:



- Time In [F12]:** Shows fewer frames of the show at one time. Hitting this command several times will give you an extreme close up of the animation data.
- Time Out (<Shift>+[F12]):** Shows more frames of the show at one time. Hitting this command several times will show you a complete view of your show.
- Time Fully In (<Control>+[F12]):** Shows the closest possible view of the data.
- Time Fully Out (<Control>+<shift>+[F12]):** Shows the entire show at one time.
- To Selected Range:** Available only if a stretch of time has been selected on the OffLine Editing Window. Zooms the OffLine Editing Window to where the selected area fills the window.

## Value Scale Display

These commands are used to zoom in and out the view on the analog pane of the OffLine Editing Window. You can zoom in to show a closeup of the analog data, or zoom all the way out to where the selected scale fills the analog pane. The options are:



- Values In:** Gives a closer look at the data.
- Values Out:** Gives a less detailed look at the data.
- Values Fully In (<Control>+[F11]):** Shows the closest possible view of the data.

- d) **Values Fully Out (<Control>+<shift>+[F11]):** Shows the entire show on one screen.
- e) **Values Scale Display:** Used to set the numbering system used for displaying analog values on the OffLine Editing Window.
  - i) **Percentage:** Used when mixing analogs of different resolutions or you just want a percentage scale.
  - ii) **8 Bits:** Normally used to give an absolute view of eight bit analogs.
  - iii) **12 Bits:** Normally used to give an absolute view of twelve bit analogs.
  - iv) **16 Bits:** Normally used to give an absolute view of sixteen bit analogs.
  - v) **24 Bits:** Normally used to give an absolute view of twenty-four bit analogs.
  - vi) **32 Bits:** Normally used to give an absolute view of thirty-two bit analogs.

The Value Scale Display is used to select what scale is used to display values in the analog pane of the OffLine Editing Window. You normally use the default percentage scale. It allows mixing analogs of different resolutions on the same window. A higher resolution analog channel would only appear in a lower resolution scaled window at the few points where it dipped down into the lower scale's range. Lower resolution analog values appear in higher resolution scaled windows as a flat line right along the bottom of the pane.

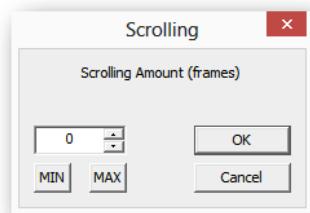
You can freely paste between analogs of different resolutions, and even digital functions.

## Auto Scroll

When ON, the OffLine Editing Window will smooth scroll or jump-scroll to follow any playback. This allows you to see a show graphically as it is played. When you are doing a lot of editing on a small stretch of the show, this feature can become annoying. This allows you to turn it OFF. You must then scroll the OffLine Editing Window manually.

## Scroll Amount...

This sets the number of frames the arrow keys in the OffLine Editing Window will step the show.



## Vertical Grid

This command toggles the OffLine Editing Window vertical grid off/on.

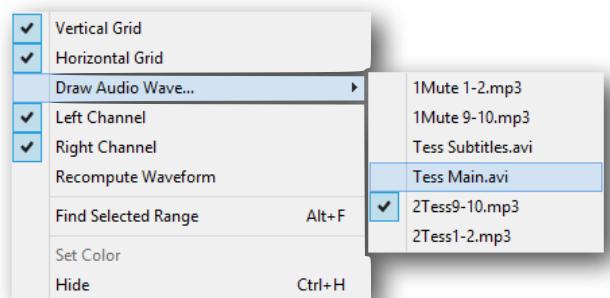
## Horizontal Grid

This command toggles the OffLine Editing Window vertical grid off/on.

## Draw Audio Waveform

Only one audio waveform can be displayed on the OffLine Editing Window at one time. This sub-menu allows you to select from the audio waveforms from among all the Audio/Video files you have used in your show.

The '[Edit](#)' menu's '[Yak](#)' function is based upon the audio waveform displayed on the OffLine Editing Window.



## Left Channel

This command toggles the display of the Left Audio Channel on the OffLine Editing Window. It is only available if there is (or has been) a AudioFile/VideoFile associated with this show.

## Right Channel

This command toggles the display of the Right Audio Channel on the OffLine Editing Window. It is only available if there is (or has been) a AudioFile/VideoFile associated with this show.

## Recompute Waveform

When the OffLine Editing Window first opens on a AudioFile/VideoFile show it will evaluate the entire audio waveform so that it can be displayed quickly. It will also be automatically recomputed if you select another audio file or change the audio file's length. Pc•MACs can't tell if you have edited a AudioFile/VideoFile or rerecorded it without changing its length or name. This command allows you to tell Pc•MACs to recompute this waveform if needed. Hitting a <space bar> while Pc•MACs is evaluating a waveform will stop it where it is. The audio waveform will only be displayed up to the point where you canceled the evaluation.

## **Find Selected Range <Option/Alternate>+F)**

This command moves the left edge of the selected area to the left side of the OffLine Editing Window.

## **Set Color...**

This command calls up the Windows Color Picker so you can set the color used to display any selected analog channel(s) on the OffLine Editing Window.

## **Hide (<Control>+H)**

This command ‘Hides’ the selected channel(s) on the OffLine Editing Window. Edits will effect hidden channels. If you don’t want to edit a channel, move it off the OffLine Editing Window using the '[Move to OffLine...](#)' dialog.

## **Show All (<Alternate/Option>+H)**

This command causes any channel(s) hidden with the Hide Command to be displayed again.

## **Show Triggers (<shift>+<Option/Alternate>+T)**

This command hides or shows all the OffLine Editing Window drag-n-drop triggers.

## **Delete All Triggers**

This is a rather drastic command that allows you to delete all the existing drag-n-drop triggers from your show. It can not be undone, short of reverting to a backup show.

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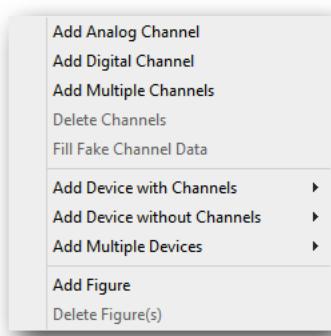
# 'Channels' Menu

The '[Channels List](#)' is where you tell Pc•MACs about all of the things it is controlling for in your installation. The 'Channels Menu' is where all the commands for naming and adjusting 'Figure' folders, 'Sequencer' folders, 'Device' folders and Analog and Digital Output Channels are found. These are saved as a part of your Site File (your FileName.STE).

All the shows that run at this site should use the same site (.STE) file. If you rename or add something to the [Channels List](#), it is instantly reflected in all of the other shows that run at this site.

## Show/Hide Channels List ([F7])

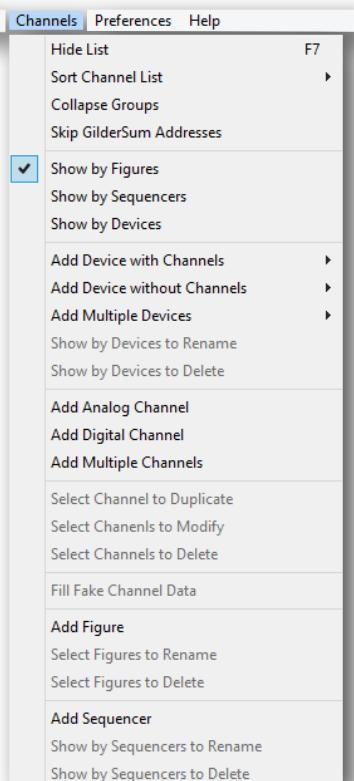
This command is used to open the [Channels List Window](#) if it wasn't open, or hide it if it was. This Window displays a hierarchical list of all the channels that have been assigned. 'Figure' folders can be opened or closed to show or hide the channels within them. Do this by LeftClicking on the '>' at the left of one of the 'Figure' folders. This will open up the 'Figure' folder (the '>' turns into a 'V') so you can see the channels within it. You 'close' a 'Figure' folder by clicking on the 'V'.



Many of the commands for the [Channels List](#) are also available from the popup shortcut menu that appears if you Right+Click anywhere in the [Channels List](#).

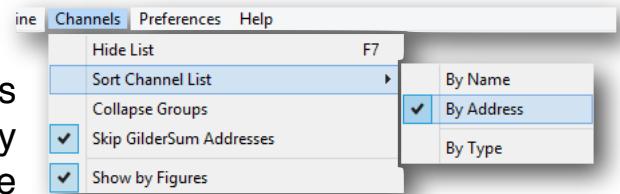
Once the [Channels List](#) is displayed, you can select analog and digital channels for modification using the other commands under 'Channels' menu. Double clicking on a figure or movement will get you immediately to the editing window for the analog or digital 'Channel', 'Figure' folder, 'Sequencer' folder or 'Device' folder you selected.

The [Channels List](#) can be stretched to any size you wold like. In the following examples, they are shrunk down to about the minimum you would ever use.



## Sort Channel List

This command allows you to sort the lists of Channel Names by type (Analog or Digital), then alphabetically or by the hardware address they have been given. If they are also sorted by 'type', then analogs and digitals will be segregated and then sorted.



## Collapse Groups

This command closes all 'Figure' folders, 'Device' folders and 'Sequencer' folders on the [Channels List](#). At the topmost level, an installation with thousands of outputs can all fit into a handful of folders. All the Analog and Digital outputs, 'Device' folders, 'Sequencer' folders, and 'Figure' folders can be nested into layers of folders within folders in the [Channels List](#).

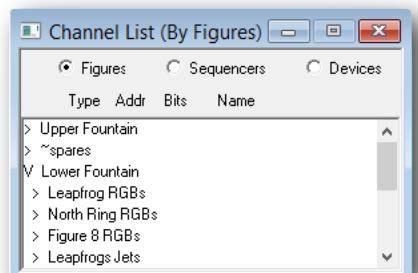
## Skip GilderCheckSum Addresses

When ON, this toggle tells Pc•MACs to automatically skip over the four DMX-512 addresses that are used for the [GilderCheckSums](#) when adding devices or channels to the [Channels List](#). When this checkbox is 'OFF', then as the [Channels List](#) is filled with output channels, the [GilderCheckSums](#) locations will be used for normal DMX-512 device addresses. This checkbox defaults to 'ON'.

**GilderCheckSums:** If talking to GilderGear over the DMX-512 network, you will normally want to use the checksums to keep the outputs from being updated on bad DMX-512 packets. If you are only talking to third party devices (like lighting equipment) within a universe, then the GilderChecksums are superfluous, and you might as well use the four GilderChecksum channels for the normal DMX-512 data.

## Show by Figures

This tells the [Channels List](#) to sort and display its contents using the 'Figure' folders. This is the default mode of operation for the [Channels List](#), and the only way you will be accessing the [Channels List](#) in most single-sequencer applications.



## Show by Sequencers

This tells the [Channels List](#) to sort and display its contents using the ‘Sequencer’ folders. You will normally only use this view when you are dragging channels between sequencers in a multi-sequencer project. When Devices, analog and digital Channels and Figure folders are added the [Channels List](#), they are normally added to the first sequencer. If yours is a multi Sequencer application, you can freely drag Devices, channels and Figure folders into the sequencer in which they will be living.

If your applications only uses single sequencers, you will probably never need to access this view of the [Channels List](#).

Channel List (By Sequencer)			
Type	Addr	Bits	Name
> Upper Fountain			
V	Lower Fountain		
anlg	B0	8	Red fig8-29
anlg	B1	8	Green fig8-29
anlg	B2	8	Blue fig8-29
anlg	B3	8	Red fig8-21
anlg	B4	8	Green fig8-21

## Show by Devices

This tells the [Channels List](#) to sort and display its contents using the ‘Device’ folders. You can freely drag individual analog and digital channels, as well as Figure Folders between the ‘Device’ folders.

Other than when you are updating an older show to run on the latest versions of Pc•MACs, you will rarely need to use this [Channels List](#) view.

Channel List (By Device)			
Type	Addr	Bits	Name
> dac-quad-02			
>	UF pb-dmx/08		
>	rgb lamp-01		
V	rgb lamp-02		
anlg	B3	8	Red fig8-21
anlg	B4	8	Green fig8-21
anlg	B5	8	Blue fig8-21

It’s easy to recognize a pre-Devices show. Just switch to the ‘by Devices’ view. You will see all of your analogs and digital channels, but no ‘Devices’ folders will be in the [Channels List](#). Full instructions for updating older Pc•MACs shows to run under the latest versions of Pc•MACs can be found in the [Updating Older Shows](#) section of this manual.

## Add Device with Channels

*This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

‘Devices’ are the preferred way of adding channels to the [Channels List](#), instead of adding individual analog and digital channels.

‘Devices’ are simply groups of analog and digital output channels, with additional meta data that tells Pc•MACs about any special abilities that the selected device features. There are two device lists. The first is exclusively for GilderGear like

Br-miniBrick8s, Br-ANAs and Br-Brain4s. The second is for third party devices like lighting fixtures, effects machines, and anything else that can be controlled via a DMX-512 network.

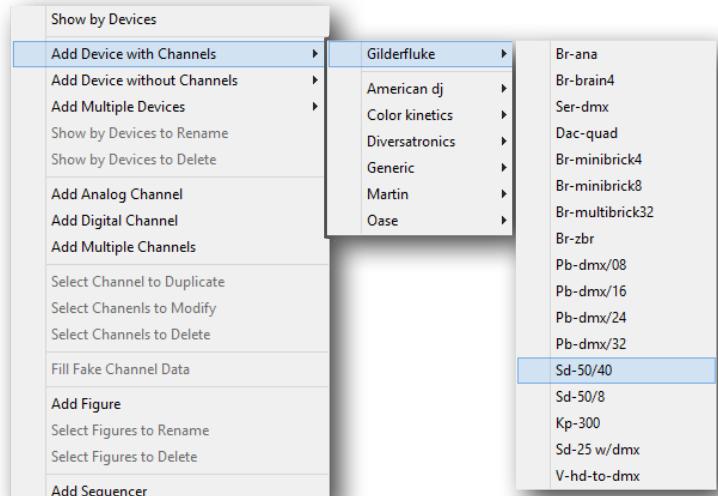
You add a ‘Device with Channels’ to the [Channels List](#) by selecting this command, and sliding over to the manufacturer, then to the specific ‘Device’ you want to add.

Some GilderGear will then ask you about the number of outputs you want to use, their analog resolutions, or other special features unique to that ‘Device’. You will typically just use the ‘default’ answers for these questions.

The Channels for the device you are adding are always added AFTER THE LAST CHANNEL USED in the [Channels List](#). If the addresses of a block of channels crosses a DMX-512 universe boundary, or the location of any of the [GilderCheckSums](#) (if the [Skip GilderCheckSum Addresses](#) option is not on), Pc•MACs will skip over these ‘pre-occupied’ channels so that the channels used in a ‘Device’ are never split across a GilderCheckSum or universe boundary.

Only GilderGear can be used as a ‘target’ device for an AutoDownload. Only GilderGear has the features needed to play back a show as a standalone ‘Device’ or as a DMX-512 ‘master’. Most GilderGear can also be used as a DMX-512 ‘slave’, listening to DMX-512 set to it through a DMX-512 network.

Some GilderGear, and all third-party devices can only be used as ‘slave’ devices on a DMX-512 network. Third party devices don’t have the features needed to play back a show as a standalone ‘Device’ or as a DMX-512 ‘master’



## Add Device without Channels

*This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

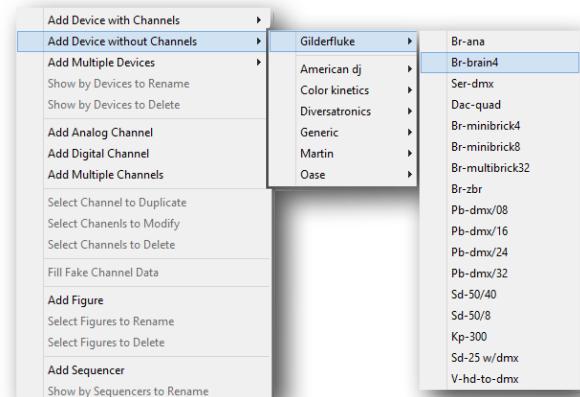
This command is very similar previous ‘[Add Device with Channels](#)’ command. The ‘Without Channels’ is a special command which is used to update older shows which already have all the channels they need in the [Channels List](#), but were created using a version of Pc•MACs from before we added the ‘Devices’ options.

As the name implies, this command adds the Devices, but does not add any additional outputs to the [Channels List](#).

You add a ‘Device *without* Channels’ to the [Channels List](#) by selecting this command, and sliding over to the manufacturer, then to the specific ‘Device’ you want to add.

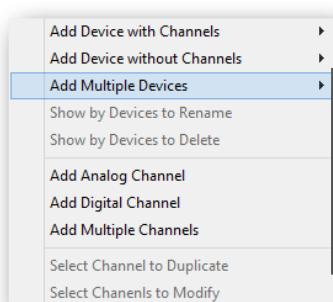
Once your ‘Devices have been added to the [Channels List](#), you can switch over to the ‘By Devices’ view of the [Channels List](#), and drag the pre-existing analog and digital channels to the newly added ‘Devices’.

For complete instructions of updating an older show to run on the latest versions of Pc•MACs, please see the [Updating Older Shows](#) section of this manual.

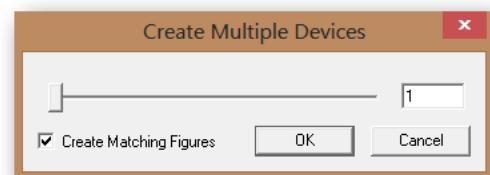


## Add Multiple Devices

*This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*



This is another variant of the [Add Device with Channels](#) command. You select the device you wish to add to the [Channels List](#), just as you do for the normal Add Devices with Channels command. Pc•MACs then asks you how many of these devices to add. As a side benefit, you can also check the ‘Create Matching Figures’, and Pc•MACs will also create Figure Folders to put the newly created channels into.



The Channels for the device you are adding are always added AFTER THE LAST CHANNEL USED in the [Channels List](#). If the addresses of a block of channels crosses a DMX-512 universe boundary, or the location of any of the [GilderCheckSums](#) (if the [Skip GilderChecksum Addresses](#) option is not on), Pc•MACs will skip over these ‘pre-occupied’ channels so that the channels used in a ‘Device’ are never split across a GilderChecksum or universe boundary.

This command is most often used when adding light fixtures to a show, as they rarely come in small numbers.

## Select Devices to Rename/Rename Device

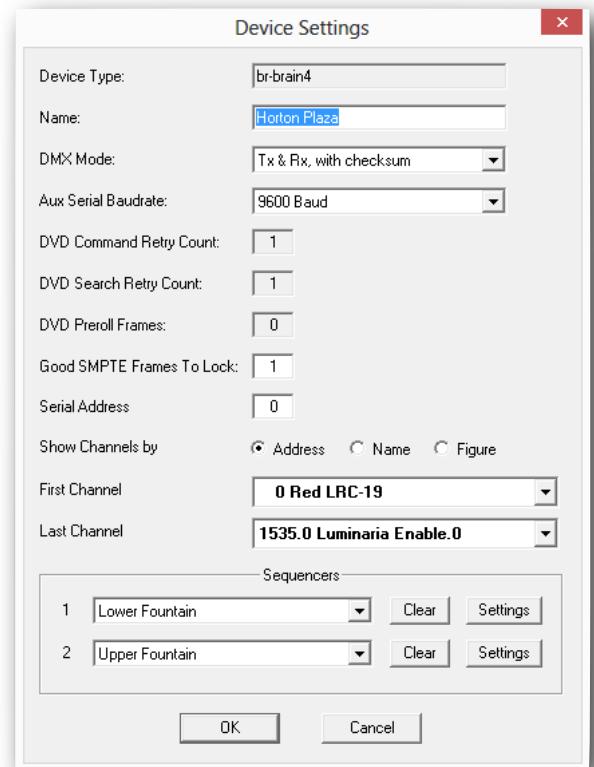
*This command is available only when you are viewing the [Channels List 'by Devices'](#), and have selected a 'Device' in the [Channels List](#). You can also double click on a 'Device' to open the dialog for that device. This dialog can also be accessed from the [AutoDownload dialog](#).*

This opens the 'Device Settings' dialog. Here you can rename the Device, and adjust all of its settings, and the settings for any sequencer(s) that are going to be run from this Device.

In this example, this 'Device Type' is a Br-Brain4. The name has been changed from the default 'Br-Brain4' to the name of the project where it is installed ('Horton Plaza', in San Diego, California). This is what is displayed on the Br-Brain4's LCD display when it is running.

The range of channels that will be AutoDownloaded to this Br-Brain4 is from channel 0 to channel 1,535, and there are two sequencers running on this Br-Brain4 ('Lower Fountain' and 'Upper Fountain')

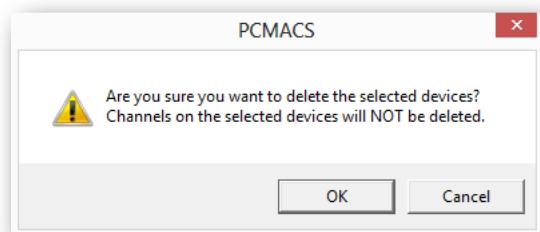
The Br-Brain4 has far more options than most other devices. About half of these will disappear when viewing the settings for other GilderGear.



## Select Devices to Delete/Delete Device

*This command is available only when you are viewing the [Channels List 'by Devices'](#), and have selected a 'Device' in the [Channels List](#). This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

This command allows you to remove a ‘Device’ you have added to the [Channels List](#), but no longer need. As the warning will tell you, this only deletes the ‘Device’ folder, and any analog and digital channels within that folder are NOT deleted. They are assigned to the ‘none’ device, and can be drag-n-dropped into another device if needed.



## Add Analog Channel...

*This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

*Instead of building up your [Channels List](#) channel-by-channel, it is always preferable to use the Add Device with Channels command whenever possible. If you populate a ‘Figure’ folder with the channels needed to control a new ‘Device’, you will be able to save this as a new third party Device, and use it in any future [Channels List](#) just like any other third party device (feature coming soon).*

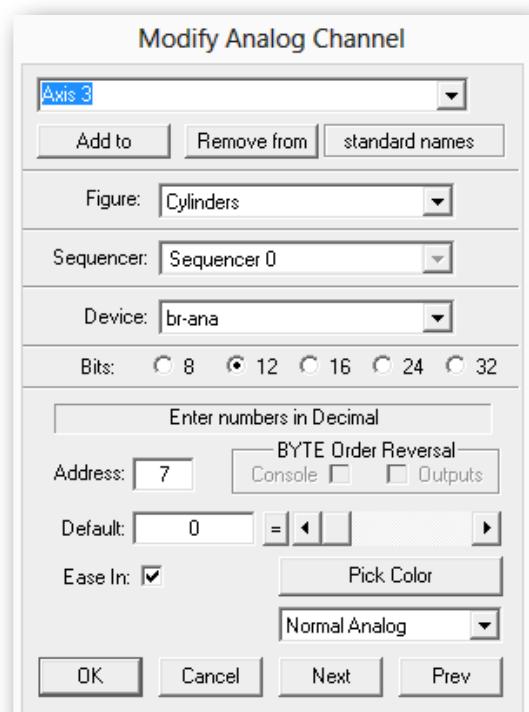
This brings up the dialog for creating a new analog output channel. This dialog is also used to modify an existing analog output (double click on the Analog's name in the [Channels List](#), or select the channel and use the ‘Channels’ menu’s [Modify Channels](#) command).

If you want the channels to be assigned to a specific figure, select the ‘Figure’ folder before invoking this command. This new analog defaults to an eight bit resolution output located at the next available address. The default position is set to 50%. When an empty channel is first closed, it is filled from one end of the show to the other with whatever you have set as the ‘default’ value.

Things that can be set in this dialog are:

### 1) Name of the channel...

This can be any text string of up to thirty-two characters. A popup is available that allows you to quickly use names from your list of ‘standard’ channel names. This list contains your most commonly used names so you don’t have to enter them more than once.



To add a name to this list, enter the name and press the 'Add to' button. To remove a name from the Standard list of names, enter the name you would like removed (or pop it up) and press the 'Remove from' button. These are stored in the 'CHANNELS.LST' file on your hard disk.

## 2) 'Figure' folder...

This sets which 'Figure' that this channel will be displayed under in the hierarchical lists of channels. 'Figure' folders are created using the [Create Figure](#) command below. If you invoke the [Add Device](#), [Add Multiple Devices](#), [Add Analog](#), [Add Digital](#) or [Create Multiple Channels](#) commands while a single 'Figure' folder is highlighted, then these new channels will be added to the highlighted 'Figure' folder.

To change the figure assignment for a movement, just pop open the list of 'Figure' folders and select the figure you would like to use, or drag-n-drop it on the [Channels List](#).

## 3) 'Sequencer' folder...

This sets which 'Sequencer' that this channel belongs to. The Channel will only run when this sequencer (or flatten) has been selected from the 'sequencer' drop-down on the ['Control' window](#). 'Sequencers' are created using the [Add Sequencer](#) command below. If you invoke the [Add Device](#), [Add Multiple Devices](#), [Add Analog](#), [Add Digital](#) or [Create Multiple Channels](#) commands while a single 'Sequencer' folder is highlighted, then these new channels will be added to the highlighted 'Sequencer' folder.

## 4) 'Device' folder...

If you have added devices to the [Channels List](#) using the normal '[Add Device with Channels](#)' or '[Add Multiple Devices](#)', the 'Device' will be created and the channels will automatically be added to it. You won't normally have any reason to move these channels to other devices.

If you created analog and digital channels using the [Add Analog](#), [Add Digital](#) or [Create Multiple Channels](#), they won't necessarily be associated with any 'Device'. You may want to move them into a 'Device' folder.

If you invoke the [Add Analog](#), [Add Digital](#) or [Create Multiple Channels](#) commands while a single 'Device' folder is highlighted, then these new channels will be added to the highlighted 'Device' folder.

A different 'Device' can be selected for this channel using this drop-down. A quicker way of moving outputs between devices is just to drag-n-drop them in the [Channels List](#).

## 5) Resolution

This is used to set the analog Resolution used for this analog channel. Resolutions supported by Pc•MACs are eight, twelve, sixteen, twenty-four and thirty-two bits wide. If the base address is not available or valid for the resolution you have selected, Pc•MACs will beep at you and automatically change the base address to the next available valid address.

Most current analog output GilderGear (Br-ANA, DAC-Quad, SER-DMX, Br-EFB/Quad) will support resolutions of eight, twelve or 16 bits. You can use a mix of resolutions, or even higher resolution data (twenty-four or thirty-two bits) on all current analog output cards, but you will need to insert an Sd card with the AutoDownload file on it. Once the analog output card has been set to the correct DMX-512 address, it will use the AutoDownload file to read the resolution information from the AutoDownload file header, and will skip any digital outputs that it finds.

The analog resolutions that Pc•MACs supports are:

- a) **Eight Bit Analog Resolution:** This is the ‘default’ resolution when creating a new analog output channel. There are 256 steps between the two extremes of an eight bit resolution analog function. Eight bit resolution analogs occupy only a single DMX-512 address. Eight bit resolution analogs can be addressed to any DMX-512 address that isn’t already occupied by another output function.

Most third party gear will use exclusively Eight Bit Resolution Analogs. A dimmer, each channel of a RGB Led light, or each control channel of a smog machine will all be eight bit resolution analog channels.

- b) **Twelve Bit Analog Resolution:** There are 4096 steps between the two extremes of a twelve bit resolution analog function. When using twelve bit analog values, the lower four bits of the next two analog outputs are stored first, followed by the MSB of each channel. Because of this, twelve bit resolution channels are restricted to DMX-512 addresses which cannot be divided by three.
- c) **Sixteen Bit Analog Resolution:** There are 65,536 steps between the two extremes of a sixteen bit resolution analog function. When using sixteen bit analog values, the data alternates between the LSB and MSB for each output.

By default, the order of the two consecutive DMX-512 bytes is ‘Little Endian’. The lower of the two DMX-512 addresses holds the lower eight

bits (LSB) of the sixteen bit value. The next consecutive byte holds the upper eight bits (MSB) of the sixteen bit value. The DMX-512 address for this channel always points to the upper eight bits (MSB) of the sixteen bit value, which is the second of the two DMX-512 channels used.

If your controlled DMX-512 device requires the data to be sent MSB first ('Big Endian'), check the 'Output Byte Order Reversal' checkbox. You will see the DMX-512 address change to point to the first of the two bytes used for this channel, as it is now the MSB. If the console provides the data to Pc•MACs MSB first ('Big Endian'), check the 'Console Byte Order Reversal' checkbox as well.

A small number of third party DMX-512 slaves will use sixteen bit resolution outputs. This is typically for X/Y movements of moving head and moving mirror light fixtures. These will usually need the output byte order to be reversed so that the MSB will come first ('Big Endian').

- d) **Twenty-four Bit Analog Resolution:** There are 16,777,215 steps between the two extremes of a twenty-four bit resolution analog function. With a movement of almost 55 feet in length, this would give you a resolution of 1/1000 of an inch. For metric fans, this would be 1 mm resolution over a distance of 426 kilometers. This resolution is rarely used in the real world. When using twenty-four bit analog values, the data alternates between the LSB, MID and MSB for each output.

By default, the order of the three consecutive DMX-512 bytes is 'Little Endian'. The lower of the three DMX-512 addresses holds the lowest eight bits (LSB) of the twenty-four bit value. The next consecutive byte holds the middle byte, and the byte after that holds the uppermost eight bits (MSB) of the twenty-four bit value. The DMX-512 address for this channel points to the upper eight bits (MSB) of the sixteen bit value, which is the third of the three DMX-512 channels used.

If your controlled DMX-512 device requires the data to be sent MSB first ('Big Endian'), check the 'Output Byte Order Reversal' checkbox. You will see the DMX-512 address change to point to the first of the three bytes used for this channel, as it is now the MSB. If the console provides the data to Pc•MACs MSB first ('Big Endian'), check the 'Console Byte Order Reversal' checkbox as well.

e) **Thirty-two Bit Analog Resolution:** There are 4,294,967,295 steps between the two extremes of a thirty-two bit resolution analog function. With a movement of almost 68 miles in length, this would give you a resolution of 1/1000 of an inch. For metric fans, this would be 1 mm resolution over a distance of 109,092 kilometers. This resolution is rarely (i.e.: never) actually used in the real world. When using thirty-two bit analog values, the data alternates between the LSB, MID low, MID high and MSB for each output.

By default, the order of the four consecutive DMX-512 bytes is ‘Little Endian’. The lower of the four DMX-512 addresses holds the lowest eight bits (LSB) of the thirty-two bit value. The next consecutive byte holds the middle byte, then the upper middle byte, and the byte after that holds the uppermost eight bits (MSB) of the thirty-two bit value. The DMX-512 address for this channel points to the upper eight bits (MSB) of the thirty-two bit value, which is the fourth of the four DMX-512 channels used.

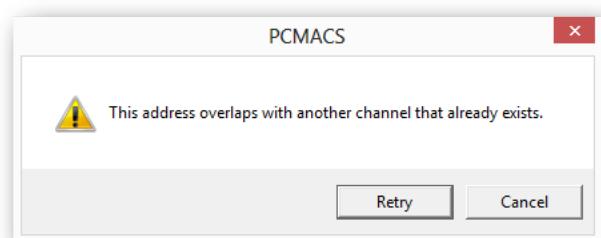
If your controlled DMX-512 device requires the data to be sent MSB first (‘Big Endian’), check the ‘Output Byte Order Reversal’ checkbox. You will see the DMX-512 address change to point to the first of the four bytes used for this channel, as it is now the MSB. If the console provides the data to Pc•MACs MSB first (‘Big Endian’), check the ‘Console Byte Order Reversal’ checkbox as well.

## 6) Address

DMX-512 address used for the MSB of the analog channel. This is the one value which is actually based in the hardware, as it represents the actual address where this movement is addressed.

When adding analog channels one at a time, Pc•MACs will automatically assign the analog to the first available DMX-512 address. If this is not where you would like this channel addressed, you can manually readdress it, so long as it doesn't interfere with another existing channel.

When you close this dialog and the address used for an existing channel has been changed, Pc•MACs will check to see if the new address is already being used (or overlaps) another output, or is invalid for the resolution selected. Pc•MACs will give you a warning, and the opportunity to cancel or try



another address.

When the modified address is valid, Pc•MACs will automatically move any show data from the old address and store it at the new address. This works well when you only have a single show using this site file. If you have more than one show using this site file, you will probably want to [save a macro](#) of the original data from each show, and then [insert the macro](#) back into each show once the address has been changed.

## 7) Byte Order Reversal

By default, Pc•MACs will create sixteen, twenty-four and thirty-two bit resolution channels as 'Little Endian'. These have the less significant byte(s) sent before the most significant byte MSB of each channel. The DMX-512 address always points to the MSB for any analog channel, so you will see a 'gap' in the DMX-512 addresses in the [Channels List](#) just before the address of a twelve bit or higher resolution channel. These skipped channels aren't actually skipped. They just hold the less significant nibbles or bytes of the twelve bit or higher resolution analog channel. You can see these LSB(s) if you [monitor](#) the addresses just before the MSB for a higher resolution analog channel.

If you check the 'Output' Byte Reversal checkbox, then the selected analog channel will be output as a 'Big Endian' analog. The DMX-512 address in the [Channels List](#) will still point to the MSB of the high resolution analog channel, and the DMX-512 address for this channel will be adjusted to show that it is now the first DMX-512 address used by this channel. The Most Significant Byte (MSB) will be sent first, and followed by one, two or three additional Less Significant Bytes (LSBs). The 'gap' shown in the DMX-512 addresses in the [Channels List](#) will now follow the MSB of the 'Big Endian' analog.

If the console you are using for programming a 'Big Endian' analog also only supports only 'Big Endian' data, you can reverse it by using the 'Console' Byte Reversal checkbox. You don't need to do this when using a Gilderfluke & Co. programming console to program 'Big Endian' analogs. They handle this stuff automatically.

## 8) Default Value

This is the value which Pc•MACs will use to fill the analog output with when:

- a) Filling a newly created analog output.
- b) Invoking the '[Realtime](#)' menu's Clear command.
- c) When using the '[Edit](#)' Menu's '[Scale by Percentage](#)' command.
- d) When disabling outputs to their default values.

e) When using the Rubberbanding features on the OffLine Editing Window and have selected '[Scale](#)' for the rubberbanding option on the '[Preferences](#)' menu's Rubberbanding dialog.

If [Manual Mode](#) is on, and your hardware is receiving DMX-512 or serial data from Pc•MACs, you can 'jog' an analog output by moving the 'Default' slider on this dialog. This will not work if the output is already assigned to another programming console (like the Soft Console).

## 9) Ease In

Easelns are used to keep analog channels from jumping at a high rate of speed when starting and stopping shows, or performing any other actions that may cause your controlled devices to jump.

If this checkbox is checked, then the selected channel will EaselIn from within Pc•MACs, as well as after AutoDownloading to an appropriate Gilderluke & Co. target device.

Analog channels that are assigned to digital output cards will not EaselIn. Many other pieces of GilderGear will only EaselIn their 'local' outputs, but not any channels they are transmitting via DMX-512.

Currently only the Br-Brain4 and Br-EFB will EaselIn all analog channels, whether they are local, or being transmitted via DMX-512 to another device.

This checkbox defaults as 'checked' for most analog channels. You will probably want to let most analogs do the Easelns. The only exceptions are 'special' analog channels that are used for controlling odd functions, macros, and configuration on third party lighting fixtures. EasingIn on these channels won't usually cause any harm, but may make the light dance around a bit as the Easelns are taking place.

For Pc•MACs to EaselIn analog channels, the [EaselIn checkbox](#) on the [Control Window](#) must be checked. This is also available from the [RealTime Menu's EaselIn toggle](#). The speed of the EaselIn while in Pc•MACs is set under the [Preferences Menu's EaselIn Options](#). The Easelns can be up to 9.9 seconds long.

The EaselIn speeds for the permanent control system are set under the Sequencer's Setup dialog. These can be accessed from the [Channels List](#) while viewing '[by Sequencers](#)', or from the [AutoDownload](#) dialog. Multi-Sequencer devices, like the Br-Brain4 can have different EaselIn speeds set for each sequencer.

## 10) Pick Color

This opens a standard Windows color picker. The selected color will be used when displaying the channel on the OffLine Editing Window.

## 11) Analog Type

This drop down is used to select any ‘special’ powers for the analogs. Most analogs are just ‘normal’. You can select whether the analog channel is used as a Sd-50 or Sd-25 volume control, Sd-50 ServoMotor output, or as a red, green or blue lighting channel. The latter three are used by the [‘Ramp to a Color’ commands](#).

## Add Digital Channel...

*This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

*Instead of building up your [Channels List](#) channel-by-channel, it is always preferable to use the Add Device with Channels command whenever possible. If you populate a ‘Figure’ folder with the channels needed to control a new ‘Device’, you will be able to save this as a new third party Device, and use it in any future [Channels List](#) just like any other third party device (feature coming soon).*

This brings up the dialog for adding a new digital output channel. This dialog is also used to modify an existing digital output (double click on the Digital's name in the [Channels List](#), or select the channel and use the ‘Channels’ menu’s [Modify Channels](#) command).

If you want the channels to be automatically assigned to a specific figure when creating them, select the ‘Figure’ folder before invoking this command.

When this command is invoked, the new digital created. It defaults to the next available bit and address and the default position is set to 'Off'. When this window is closed the empty channel will be filled from the start of the show to the end with whatever you set as the default value.

Things which can be set in this dialog are:

### **1) Name of the channel...**

This can be any text string of up to thirty-two characters. A popup is available that allows you to quickly use names from your list of 'standard' channel names. This list contains your most commonly used names so you don't have to enter them more than once.

To add a name to this list, enter the name and press the 'Add to' button. To remove a name from the Standard list of names, enter the name you would like removed (or pop it up) and press the 'Remove from' button. These are stored in the 'CHANNELS.LST' file on your hard disk.

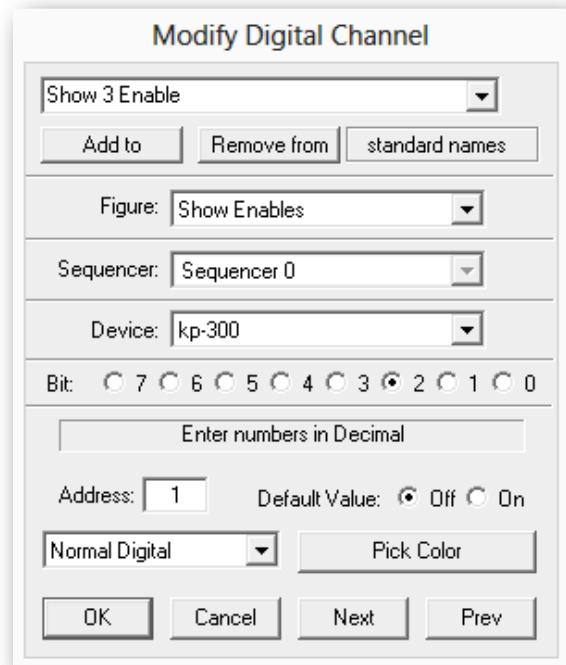
### **2) 'Figure' folder...**

This sets which 'Figure' that this channel will be displayed under in the hierarchical lists of channels. 'Figure' folders are created using the [Create Figure](#) command below. If you invoke the Add Analog or Digital command while a single 'Figure' folder or one or more movements within a single figure are selected, then this will default to that 'Figure' folder.

To change the figure assignment for a movement, just pop open the list of 'Figure' folders and select the figure you would like to use or drag-n-drop it on the [Channels List](#).

### **3) 'Sequencer' folder...**

This sets which 'Sequencer' that this channel belongs to. The Channel will only run when this sequencer (or flatten) has been selected from the 'sequencer' drop-down on the 'Control' window. 'Sequencers' are created using the [Add Sequencer](#) command below. If you invoke the Add Analog or Add Digital command while a single 'Sequencer' folder then this will default to that 'Sequencer' folder.



#### 4) ‘Device’ folder...

If you have added devices to the [Channels List](#) using the normal ‘[Add Device with Channels](#)’ or ‘[Add Multiple Devices](#)’, the ‘Device’ will be created and the channels will automatically be added to it.

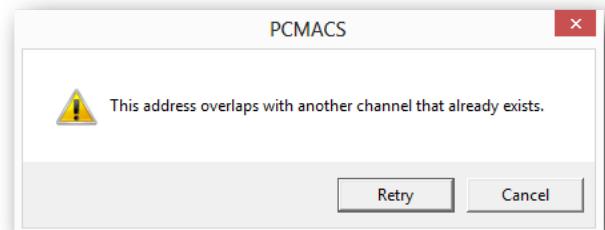
A different ‘Device’ can be selected for this channel using this dropdown.

#### 5) Address

DMX-512 address used for this digital channel. This is the one value which is actually based in the hardware, as it represents the actual address where this movement is addressed.

When adding digital channels one at a time, Pc•MACs will automatically assign the digital to the first available bit and DMX-512 address. If this is not where you would like this channel addressed, you can manually readdress it.

When you close this dialog and the address used for an existing channel has been changed, Pc•MACs will check to see if the new address is already being used by another output, or is invalid for the resolution selected. Pc•MACs will give you a warning, and the opportunity to cancel or try another address.



When the modified address is valid, Pc•MACs will automatically move any show data from the old address and store it at the new address. This works well when you only have a single show using this site file. If you have more than one show using this site file, you will probably want to [save a macro](#) of the original data from each show, and then [insert the macro](#) back into each show once the address has been changed.

#### 6) Bit Number

Bit number where this output is located. Since Pc•MACs treats all outputs as eight bit wide bytes, each digital channel contains eight digital outputs (bits) within it. This is where you select which of the eight bits is used for this particular output. This is one of the two values you must enter which is actually based in the hardware, as it represents the actual address where this movement is attached. If the bit number or address used for an existing channel is changed, the data from that channel will be moved to the new location. If the address is already occupied then Pc•MACs will warn you when this dialog is closed.

## 7) Default Value...

This is the value which Pc•MACs will use to fill the digital output with when:

- a) Filling a newly created digital output.
- b) Invoking the '[Realtime' menu's](#) Clear command
- c) When disabling outputs to their default values.

## 8) Pick Color

This opens a standard Windows color picker. The selected color will be used when displaying the channel on the OffLine Editing Window.

## 9) Digital Type

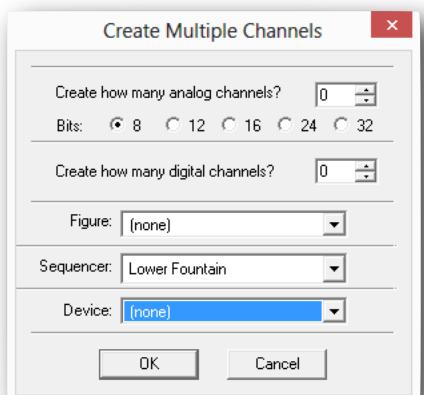
This drop down is used to select any 'special' powers for the digital channel. Most digitals are just 'normal'. You can select whether the digital channel is used as a Video, Sd-50 or Sd-25 MCU Audio/Video trigger channels.

## Add Multiple Channels...

*This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

*Instead of building up your [Channels List](#) channel-by-channel, it is always preferable to use the Add Device with Channels command whenever possible. If you populate a 'Figure' folder with the channels needed to control a new 'Device', you will be able to save this as a new third party Device, and use it in any future [Channels List](#) just like any other third party device (feature coming soon).*

This command is a shortcut used to easily create a number of analog and digital channels. It prompts you for the number of channels you want to add. The channels are created using the default values and names for the channels you requested. Analogs are created at eight bit resolution. Channels are always added AFTER THE LAST CHANNEL USED in the [Channels List](#). If you need to fill in some 'holes' in the channels assigned in your site file, you will need to use the individual Add Analog and Add Digital commands.



If you want the channels to be assigned to a specific figure or sequencer, select the 'Figure' folder or 'Sequencer' folder before invoking this command.

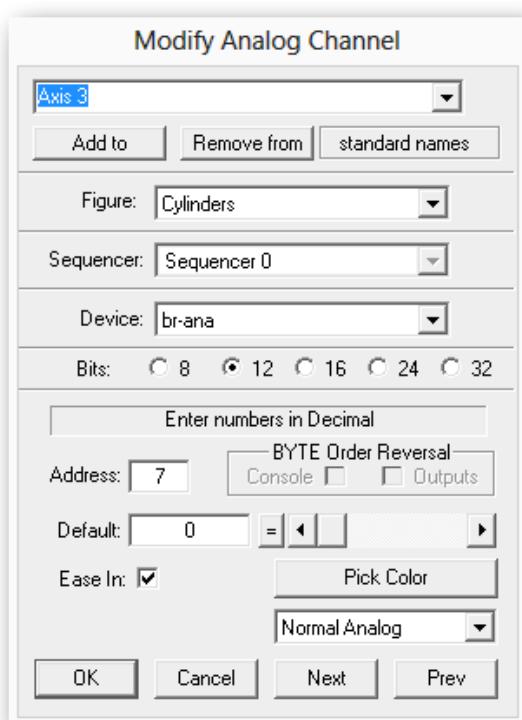
## Select Channel to Duplicate / Duplicate Channel

*This command is available only when you have selected an analog or digital ‘Channel’ in the [Channels List](#). This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

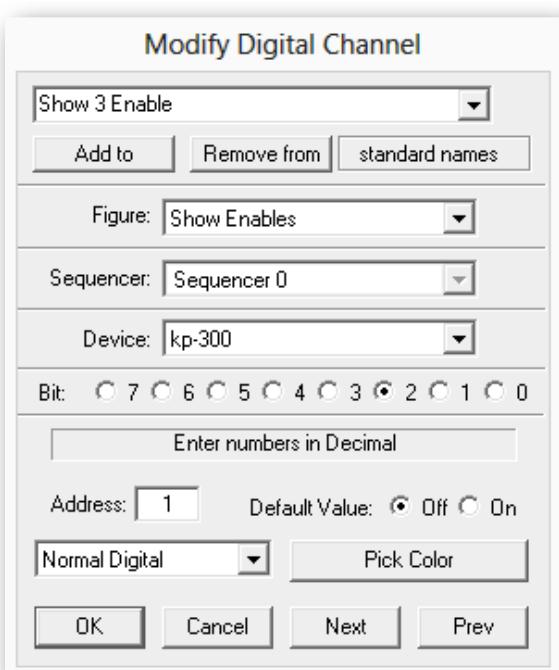
The currently selected analog or digital channel in the [Channels List](#) Window is duplicated at the next available address.

## Modify Analog/Digital Channels...

This command is available only when you have selected one or more analog or digital ‘Channels’ in the [Channels List](#). This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu. You can also just Double LeftClick on any channel in the [Channels List](#) you would like to edit.



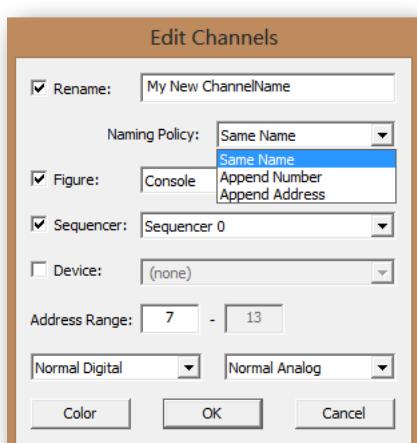
This command brings up the analog or digital creation windows to allow you to modify the selected channel. The short cut to modify any existing analog or digital channel or ‘Figure’ folder is to double click on it in the [Channels List](#) Window.



If you select more than one analog and/or digital channel to edit, you will be presented with different options you can use to edit all of the selected channels with just a few mouse clicks.

You can change:

- 1) The Channels’ names. When doing this, you can opt to append either the DMX-512 address for the renamed channels, or a simple number count (starting at ‘1’).
- 2) The Figure that the selected channels are assigned to.
- 3) The Sequencer that the selected channels are assigned to.
- 4) The ‘Device’ that the selected channels are assigned to.

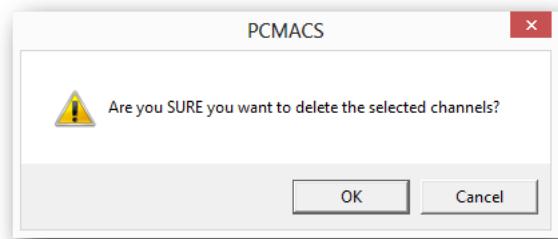


- 5) The beginning DMX-512 address for the selected channels. Be aware that since you are moving a chunk of channels, the new location must be free of obstacles (DMX universe breaks, GilderCheckSums, and other analog and/or digital channels).
- 6) You can tell Pc•MACs that these are channels with ‘special’ powers. The digitals are set using the drop-down on the left, and the analogs are set using the drop-down on the right. In most cases, these should remain set as ‘Normal’.
- 7) The color that is used to display the selected channels on the OffLine Editing Window.

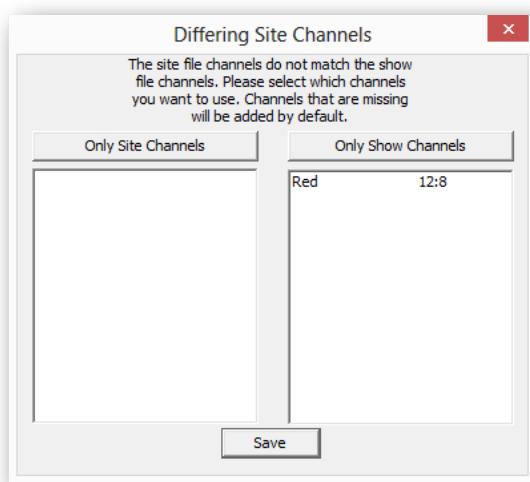
## Delete Analog/Digital Channels...

*This command is available only when you have selected one or more analog or digital ‘Channels’ in the [Channels List](#). This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

This command is used to delete any selected channel(s). Pc•MACs will confirm with you that this is actually what you intended to do. If you answer ‘Yes’ the channel will be deleted from the site file and the currently open show. The other shows that use this site file will not be changed (yet).



Pc•MACs doesn't care about adding channels, but if you have deleted any channels and open another show that uses the same site (.STE) file, it will display an error messages that there are channels missing from the site file.

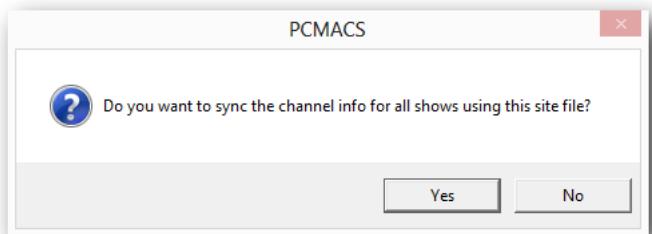


In this case, the left column is empty, and the one channel that was deleted from a different show that used this site file is shown in the right column. In this case, it is at DMX-512 address 12, and it is an 8 bit resolution analog.

If the site file is correct (you meant to delete the channel), select the button labeled 'Only Site Channels'. This will delete the channel shown in the right column from the show.

If the show file is correct (you made a mistake and want to get the deleted channel back), select the button labeled 'Only Show Channels'. This will restore the channel shown in the right column to the site file.

In either case, Pc•MACs will then ask if you want to shows in the current folder to all be synchronized with your decision. Doing this will keep Pc•MACs from asking you about the deleted channel every time you open a show that uses this site file.

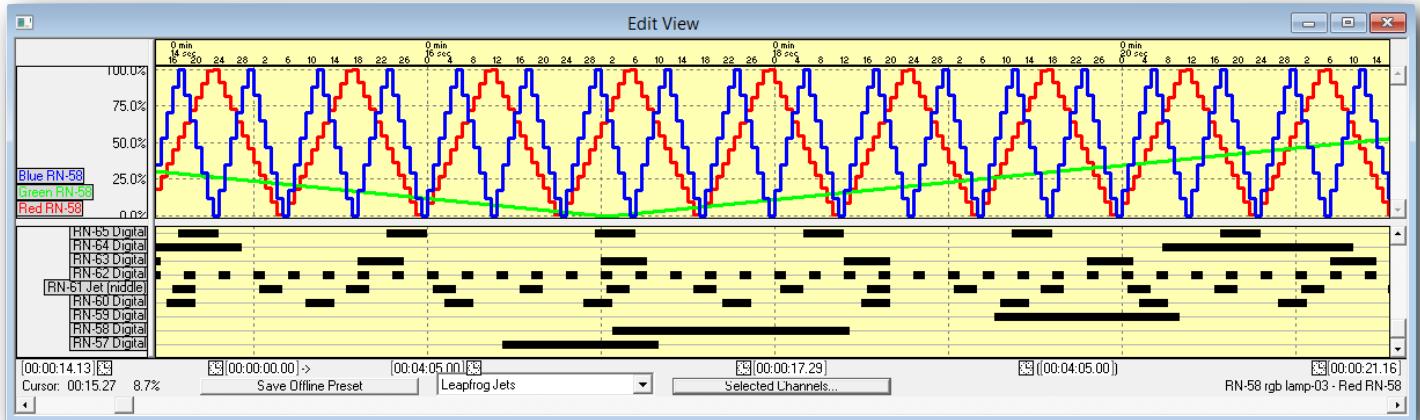


If you have the 'Preference' menu's Backup files set to anything larger than zero backup shows, you can also use these backups to go back between one and ninety-nine 'saves' using the ['File' menu's 'Restore from Backup...' command](#). This restores both the show and the site file that matches the show you choose to restore.

## Fill with Fake Channel Data

*This command is available only when you have selected one or more analog or digital 'Channels' in the [Channels List](#). This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

This command is used to fill the selected Channel(s) on the [Channels List](#) with 'fake' data to use in testing Pc•MACs and its outputs. Any selected Analogs get triangular waveforms at a variety of speeds. Any selected Digital functions get what



appears to be a somewhat random pattern. It is often used as a quick way of filling channels with something when you are buzzing out your wiring.

## Add Figure...

*This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

This command is used to create a new 'Figure' folder.

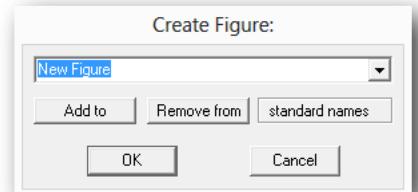
'Figure' folders are used like any 'folder' on your computer's disk. You can put analog and digital movement names into them to organize them and make them easier to manage. 'Figure' folders can be any text string of up to thirty-two characters.

To see the channels stored in a 'Figure' folder you need to 'open' it. LeftClick on the '>' at the left of one of the 'Figure' folders. This will open up the 'Figure' folder (the '>' turns into a 'V') so you can see the channels within it. You can 'close' a 'Figure' folder by clicking on the 'V'.

You can modify any 'Figure' folder by selecting it and choosing 'Channels' menu's 'Modify' command or by simply double clicking on the 'Figure' folder you want to change.

A popup is available that allows you to quickly use names from your list of standard 'Figure' folders.

This list contains your most commonly used names so you don't have to enter them more than once. To add a name to the list of standard 'Figure' folders, type it into the entry box and press the 'Add' button. They will be sorted alphabetically. To remove a name from the list, type it in (or pop it up) and press the 'Remove' button. This standard list is stored in the 'FIGURES.LST' file.

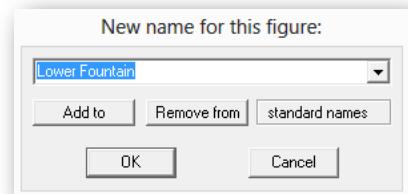


## Rename Figure...

*This command is only available if you have selected a Figure's name on the [Channels List](#). This command is also available by double LeftClicking on the 'Figure' folder you would like to rename.*

This command is used to modify the name of an existing 'Figure' folder.

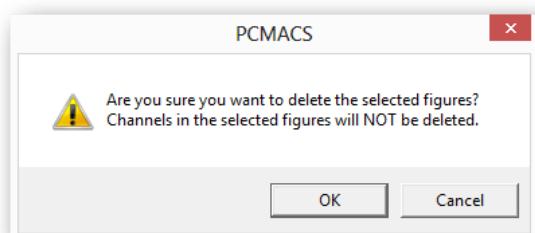
If you have selected multiple figures when you invoke this command, Pc•MACs will present each of them to you sequentially for renaming, selecting them for editing one-by-one.



## Delete Figure...

*This command is only available if you have selected a Figure's name on the [Channels List](#). This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

This is used to delete any 'Figure' folder. If the 'Figure' folder has any channels stored in it, they will be switched to 'none' for their figure assignment. Pc•MACs will display a message to tell you that your analog and digital channels aren't going to be deleted along with the enclosing 'Figure' folder.



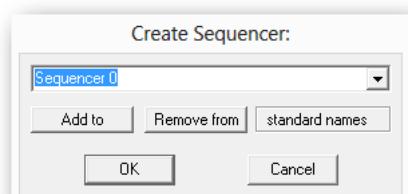
## Add Sequencer...

*This command is available only when you are viewing the [Channels List](#) 'by Sequencers'. This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

*For details on [MultiSequencer](#) and [PopOut](#) show applications, please see the [MultiSequencer](#) section of this manual.*

This opens the dialog for creating a new sequencer for your site. The default name will be 'Sequencer x'. About all you can do is give the sequencer a new name.

If you regularly use the same names for presets across multiple projects, you can build up a list of 'standard names'



for Sequencers. If you have a name you want to use again later, just press the ‘Add To’ button. That name will now be available from this dialog’s drop down across all of your GilderProjects. Instead of typing the name again, you hit the arrow at the right of the drop down to display all the ‘standard names’ you have previously saved, and pick the one you want to use.

To remove a name from the list of ‘standard names’, just pop it up, or type it in. When you press the ‘Remove From’ button, any name which matches the text in the drop down will be removed from the ‘standard names’ list.

## Edit Sequencer...

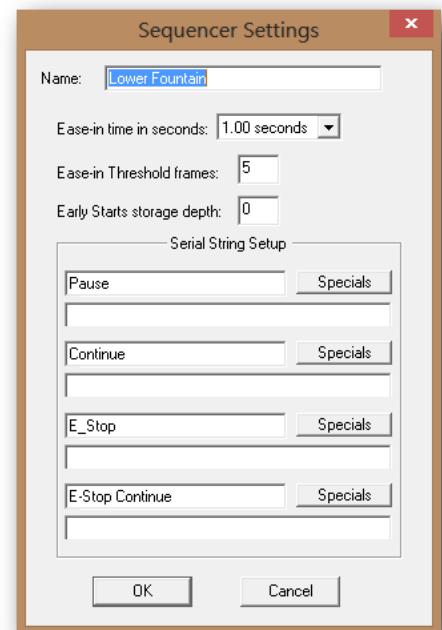
*This command is available only when you are viewing the [Channels List ‘by Sequencers’](#) and have selected a Sequencer’s name on the [Channels List](#). This command is also available from the [Channels List’s shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu, or by double-clicking on the sequencer’s name in the [Channels List](#).*

For details on [MultiSequencer](#) and [PopOut](#) show applications, please see the [MultiSequencer](#) section of this manual.

This opens the settings for the selected sequencer.

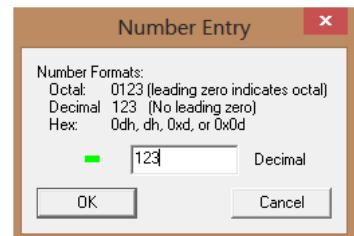
You can set:

- a) The name of the sequencer, which will appear on The Br-Brain4’s LCD and various menus. The default names for the sequencers are ‘sequencer0’, ‘sequencer1’, etc.. You can rename them with any name up to 32 characters in length. You may want to keep the name to 16 characters or less if it is to be displayed on the 16 character wide LCD found on a Br-Brain4.
- b) The Easeln time for analog Channels. Speeds range from zero up to ten seconds.
- c) The threshold for how big of a jump in frames will trigger an Easeln.
- d) How many requests the Br-Brain4 will bank if it receives start commands while running an unsteppable show.
- e) The serial strings that a Br-Brain4 will send out when a show is paused, continued, E-Stopped or E\_Cleared. Currently only the Br-Brain4 supports



sending strings out from its secondary serial port. This is where you enter your string. Entries can be separated by spaces, a comma, or a comma and spaces. If the string is entered correctly, a green light will appear above this field.

- a) Ascii strings should be enclosed within single or double quotes.
- b) Decimal values can be between any number of digits, as long as the value is between zero and 255.
- c) Hexadecimal numbers can be entered as dh, 0dh, 0xd or 0x0d.
- d) For old timers, octal values are entered as four digits with the leading digit a zero, the second digit 0-3, and the remaining two digits 0-7.
- 6) The ‘Specials’ buttons allow you to enter several commonly needed string values, as well as several ‘special’ markers for your strings:
  - a) Restore: This clears out everything from the string entry field.
  - b) String: You can enter an ascii string here. When you click ‘OK’, single quote marks are added and the text is moved to the string entry field.
  - c) Numeric Values: This gives examples of decimal, hex and octal numeric values. You can enter a decimal value here. A green light indicates that your number is formatted properly.
  - d) Make Pretty: This attempts to clean up a string that is not properly formatted.
  - e) Return: Inserts a <Carriage Return> character = 0x0d.
  - f) Line Feed: Inserts a <Line Feed> character = 0x0A.
  - g) Return/LineFeed: Inserts both a <Carriage Return> and <Line Feed> = 0x0D 0x0A.
  - h) Get Anything: This is used when you need to get a character back from the serial port, but don’t care what the value of that character is.
  - i) Talk All & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through all eight ports, and listen to only the first port. The Br-SDC8 stays in this mode until another MUX command is received.
  - j) Talk & Listen 1: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned



data through port 1. The Br-SDC8 stays in this mode until another MUX command is received.

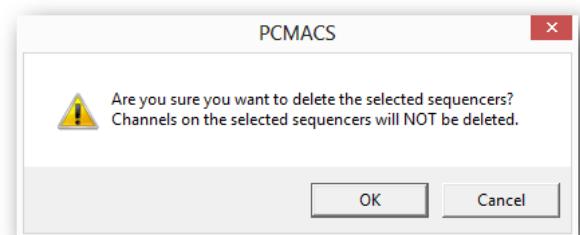
- k) Talk & Listen 2: This is MUX command used with the Br-SDC8 to send the following serial data out through port 1, and listen to only returned data through port 2. The Br-SDC8 stays in this mode until another MUX command is received.
- l) Talk & Listen 3: This is MUX command used with the Br-SDC8 to send the following serial data out through port 3, and listen to only returned data through port 3. The Br-SDC8 stays in this mode until another MUX command is received.
- m) Talk & Listen 4: This is MUX command used with the Br-SDC8 to send the following serial data out through port 4, and listen to only returned data through port 4. The Br-SDC8 stays in this mode until another MUX command is received.
- n) Talk & Listen 5: This is MUX command used with the Br-SDC8 to send the following serial data out through port 5, and listen to only returned data through port 5. The Br-SDC8 stays in this mode until another MUX command is received.
- o) Talk & Listen 6: This is MUX command used with the Br-SDC8 to send the following serial data out through port 6, and listen to only returned data through port 6. The Br-SDC8 stays in this mode until another MUX command is received.
- p) Talk & Listen 7: This is MUX command used with the Br-SDC8 to send the following serial data out through port 7, and listen to only returned data through port 7. The Br-SDC8 stays in this mode until another MUX command is received.
- q) Talk & Listen 8: This is MUX command used with the Br-SDC8 to send the following serial data out through port 8, and listen to only returned data through port 8. The Br-SDC8 stays in this mode until another MUX command is received.

## Delete Sequencer...

*This command is available only when you are viewing the [Channels List 'by Sequencers'](#) and have selected a Sequencer's name on the [Channels List](#). This command is available only when you are viewing the [Channels List 'by Sequencers'](#). This command is also available from the [Channels List's shortcut menu](#). Just Right+Click anywhere in the [Channels List](#) to pop open this contextual menu.*

*For details on [MultiSequencer](#) and [PopOut](#) show applications, please see the [MultiSequencer](#) section of this manual.*

This is used to delete any 'Sequencer' folder. If the 'Sequencer' folder has any channels stored in it, they will be switched to the first sequencer for their sequencer assignment. Pc•MACs will display a message to tell you that your analog and digital channels aren't going to be deleted along with the enclosing 'Sequencer' folder.

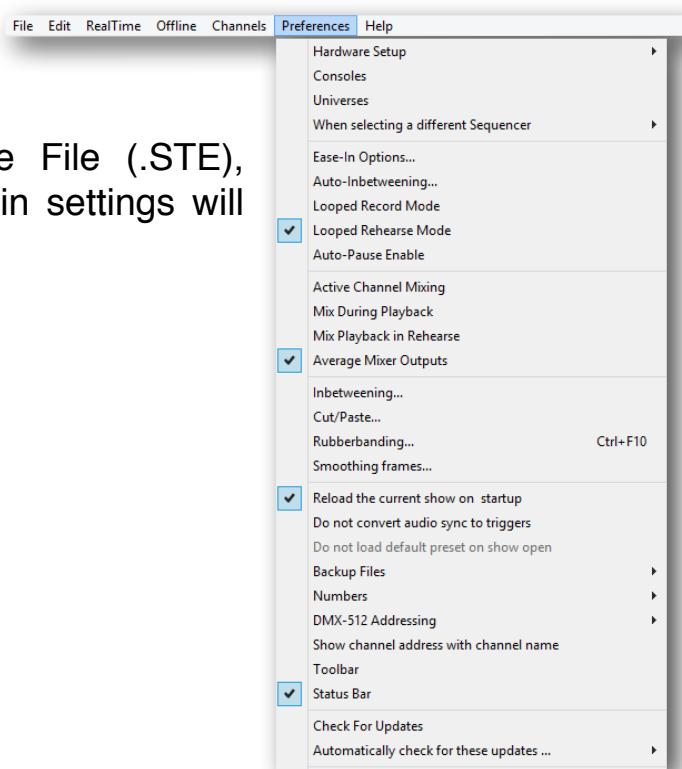




# 'Preferences' Menu

This Pulldown Menu is where all the user adjustable options are located. Most of these need to be changed only occasionally.

These are saved as a part of the Site File (.STE), PCMACS.INI or GILDER.INI. Most changes in settings will not take effect until you close the dialog.

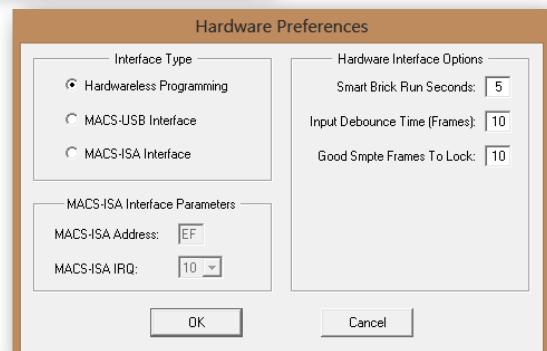
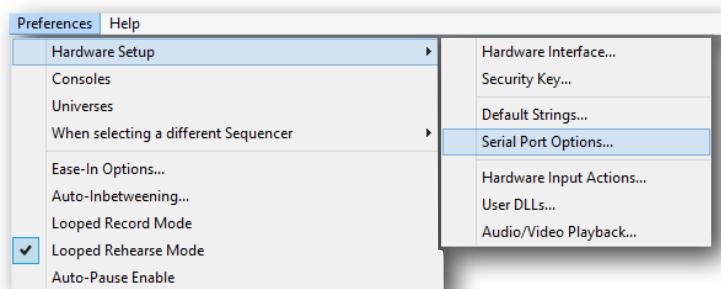


## Hardware Setup

You slide to the right to the sub-menu which is used to set the various hardware options available to Pc•MACs.

### 1) Hardware Interface

This is a legacy dialog that was used to select various hardware options with earlier versions of Pc•MACs. Just set it for 'Hardwareless', and forget about all the other settings.



## 2) Security Key

*Pc•MACs will allow you to edit any number of channels without a RealTime License. It will limit your RealTime programming to the first sixteen channels and a single sequencer if you don't have a MACs-License. Details on Pc•MACs Licensing can be found [here](#).*



This command opens the Security Key Information Dialog. You can quickly see if the Macs-License is in place on this computer. If the USB key is in place, it will clearly say



'Hardware Key in Use' and 'Currently the Security Key is ENABLED'.

If you have a USB key plugged into your computer, but the key is not enabled in Pc•MACs, check Windows Device Manager to see if Windows has found it. If Windows doesn't recognize the key, then Windows won't tell Pc•MACs about the key either. You may need to reinstall the drivers for the key, or reboot your computer. If the Device Manager sees the key and is operating properly, then try restarting Pc•MACs.

If you have ordered a Macs-License key, but it has not yet arrived, Gilderluke & Co. can issue a [Temporary Numeric MACs-License](#). This will work on a single computer for two weeks, or until the permanent key arrives and is plugged into the computer. Just call, email or FAX the twelve digit 'System Serial Number' to Gilderluke & Co., and we will check your order status and send you a numeric 'Security Key'. Enter the Security Key number without any spaces, dashes, or other punctuation marks. Press the 'Validate Key' button, and the dialog



should then say that 'Currently the Security Key is ENABLED'.

When using the [Temporary Numeric MACs-License](#), every time you open Pc•MACs or a different show, Pc•MACs will tell you how much time is remaining on your temporary license.

### 3) Default Strings...

If you are regularly using the Pause/Continue and E-Stop and E-Clear strings, you can enter the 'default' values for these strings here.

When you create a new site file or sequencer, these strings will automatically populate the sequencer's Pause/Continue and E-Stop and E-Clear strings.

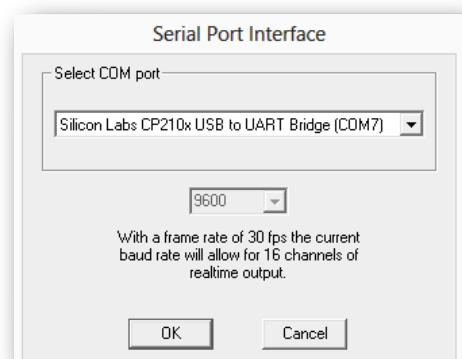
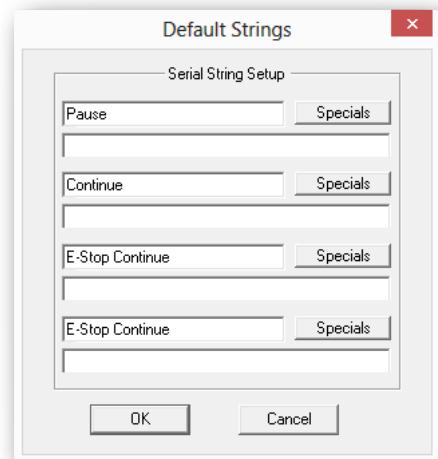
### 4) [Hardware/Serial Port Interface....](#)

*If you don't have a MACs-License, Pc•MACs will limit you to RealTime programming via the serial port to the first sixteen channels and a single sequencer. With a Macs-License, you can update more channels and increase the speed of the serial port when talking to a Br-Brain4. Details on Pc•MACs Licensing can be found [here](#).*

This dialog is used to select which serial port will be used to communicate with the Bricks.

If 'Manual' mode is 'OFF', any 'Bricks' attached to the serial port will update their outputs only when Playing/Recording/Rehearsing (or single stepping on the OffLine Editing Window).

If 'Manual' mode is 'ON', any 'Bricks' attached to the serial port will update their outputs continuously. This allows you to assign outputs to the console, and control the assigned channels manually<sup>20</sup>. When you ask Pc•MACs to 'Play' back your show, all the outputs will follow the programmed data in your show. When you do a Record or Rehearsal, all outputs that aren't actively assigned to a console will play back the preprogrammed data, while you program in new data on the assigned console channels. RealTime



<sup>20</sup> Hence the name, 'Manual' Mode

updating of the outputs through the serial port will stop when the GilderTerm window is opened or you are performing a serial AutoDownload.

The presence MACs-License will also enable running the serial port at higher than the default 9600 baud speed. This will allow more than the default sixteen channels worth of outputs to be updated through the serial port. Currently the higher speeds are supported only by the Br-Brain4.

To use the highest baud rates you will need:

- 1) A USB to serial converter that uses a Silicon Labs Cp2102 Chip (such as the [USB-RS232/422](#)).
- 2) To use the highest speeds, the configuration table within the Cp2102 Chip must be modified to support 1MBaud speeds ([see instructions here](#)).
- 3) The cable that connects between the USB to serial converter and the [Target Device](#) needs two shielded twisted pair, low capacitance cable designed for RS-422 and RS-485 (or DMX-512) use. CAT-5+ cable can be used, but should be of the type with individually shielded pairs of wire. Only two of the four pairs found in a CAT-5 cable are needed for the Rs-422 connection. With a high quality cable, you should be able to run approximately 4000 feet / 1000 meters.

GilderGear uses six position Rj-12 connectors for all RS-422 ports. The two outside pins (pins #1 and #6) are used for ground connections, and should be connected to the shields for each pair of conductors used. Twisted pair one goes to pins #2 & #3. The second pair goes to pins #4 and #5.

- 4) Termination resistors ( $\frac{1}{4}$  Watt, approximately  $120\Omega$ ) must be used at both ends of each pair of wires.

As you increase the baud rate (speed) of the serial port, Pc•MACs will send messages back and forth to the receiving device to see if it is able to communicate at the increased speed. If the communications aren't reliable enough, then both the [Target Device](#) and Pc•MACs will revert to the default 9600 baud.

If Pc•MACs had a serial port attached the last time it was opened, it will look for the serial port the next time it is opened. If it doesn't find one, it won't look for the serial port until you tell it that it has one attached again.

If the serial port is lost while Pc•MACs is running (the USB cable can get wiggled or unplugged, or Windows may just disconnect it at random times), you

will need to open this dialog and tell Pc•MACs about the serial port again (sometimes more than once). Some flavors of Windows may give you the ‘Blue Screen Of Death’ if the USB cable comes unplugged as Windows is trying to access the serial port.

If the serial port stops sending RealTime updates to the controller you are programming, put the serial port dialog still shows the serial port as attached and working, try toggling the Manual mode checkbox off and on again.

## 5) Hardware Input Actions

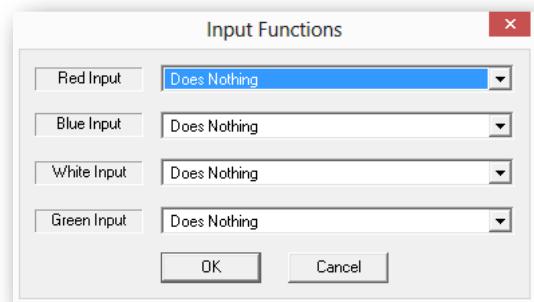
*As of this writing, this feature is ‘coming soon’.*

Just as you can assign some of the ‘transport’ commands to the inputs on the Soft Console, you can assign a superset of transport commands to up to ten inputs on the Br-Brain4 or other controller.

It can be used to synchronize a Pc•MACs system to an external event coming in through a piece of GilderGear. In most cases, the GilderGear that Pc•MACs is communicating with will be the permanent controller for the application. This allows you to simulate the final operation of the trigger inputs to the system before you have done an AutoDownload. This is particularly useful in testing ride-through attractions, where the animation, lighting and effects are triggered by a ride vehicle entering the scene.

The options for each input are:

- a) Does Nothing
- b) Starts Play Immediately
- c) Starts Record Immediately
- d) Starts Rehearsal Immediately
- e) Stops Play/Record/Rehearsal Immediately
- f) Toggles Pause/Continue Immediately
- g) Toggles Auto Punch Checkbox
- h) Toggles Manual Mode Checkbox
- i) Toggles Ease-In Checkbox
- j) Toggles Auto-Inbetween Checkbox
- k) Toggles Audio Cue Checkbox
- l) Plays Audio Cue



m) Toggles Loop Mode Checkbox

n) Wait for input before Playing: When you press the ‘Play’ button on the Main Transport Window (or pulldown or command key equivalent, it won’t actually start until this input receives a signal. A dialog is displayed, indicating it is waiting for an input from the [AutoDownload 'Target'](#) device. Buttons on the dialog allow you to bypass or cancel it if needed.

o) Wait for input before Recording: When you press the ‘Record’ button on the Main Transport Window (or pulldown or command key equivalent, it won’t actually start until this input receives a signal. A dialog is displayed, indicating it is waiting for an input from the [AutoDownload 'Target'](#) device. Buttons on the dialog allow you to bypass or cancel it if needed.

p) Wait for input before Rehearsing: When you press the ‘Rehearsal’ button on the Main Transport Window (or pulldown or command key equivalent, it won’t actually start until this input receives a signal. A dialog is displayed, indicating it is waiting for an input from the [AutoDownload 'Target'](#) device. Buttons on the dialog allow you to bypass or cancel it if needed.

Any of the ‘Play’/‘Record’/‘Rehearsal’ commands can be used in combination with any of the ‘wait for input’ commands. This allows you to force a ‘two step’ process that must be followed before a show will begin. The first input initiates the ‘Play’/‘Record’/‘Rehearsal’, but the selected operation won’t actually take place until the second input is triggered.

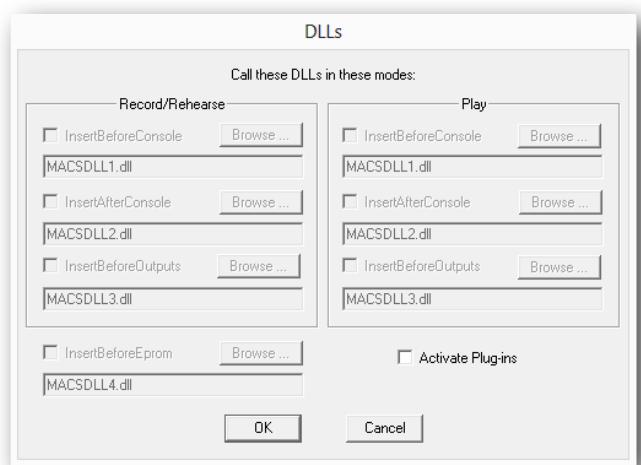
Pinout and instructions for attaching to the trigger inputs on the the [AutoDownload 'Target'](#) device can be found in the appropriate GilderGear manual.

## 6) User DLLs

This dialog is used to enable and disable the DLLs that can be used with Pc•MACs. The DLLs are user written programs that can be used to modify the show data as it flows through the Pc•MACs program. They are called:

‘Insert Before Console’) Called before the show data is sent to the programming console.

‘Insert After Console’) Called when show data is returned from the



programming console.

'Insert Before Output') Called just before show data is sent to the outputs.

'Insert Before Eprom') Called just before show data is sent to the Save as Eprom... or Save as AutoDownload.... commands.

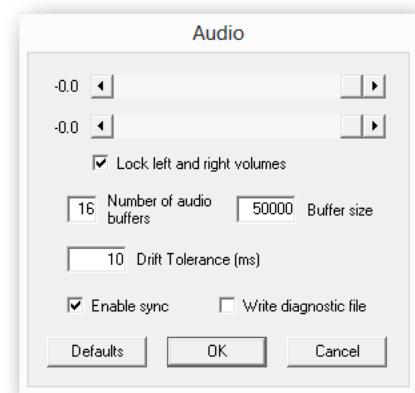
The DLLs can be named freely. This allows you to select different DLLs that are called up for different functions. The checkboxes can be used to enable/disable them for Record/Rehearsal or show Playback. The 'Activate Plug-Ins' checkbox can be used to quickly enable or disable all the DLLs in one swell foop.

## 7) Audio/Video Playback

This command is used to set the various settings that effect the playback of Audio/Video files.

If you can't hear the audio playback from Pc•MACs, check to see if the playback level is set at a low level, and then turn it all the way up.

Leave the 'Enable Sync' checked, so that Pc•MACs will adjust the frame rate to match the audio playback.

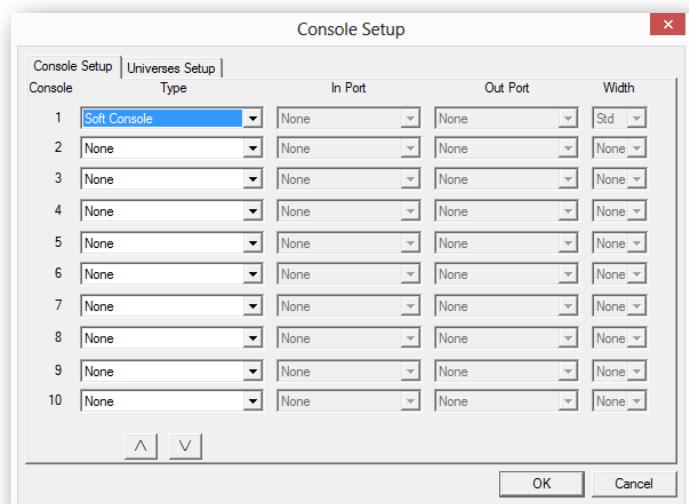


## Consoles...

Pc•MACs will support multiple consoles simultaneously. This dialog is where you select which Consoles Pc•MACs should be looking for.

The most commonly used console is the Soft Console. The Soft Console can be used with just your mouse and keyboard, or with the USB-Slider, USB-MbJoystick, or USB-AtoD (or any other gaming joystick).

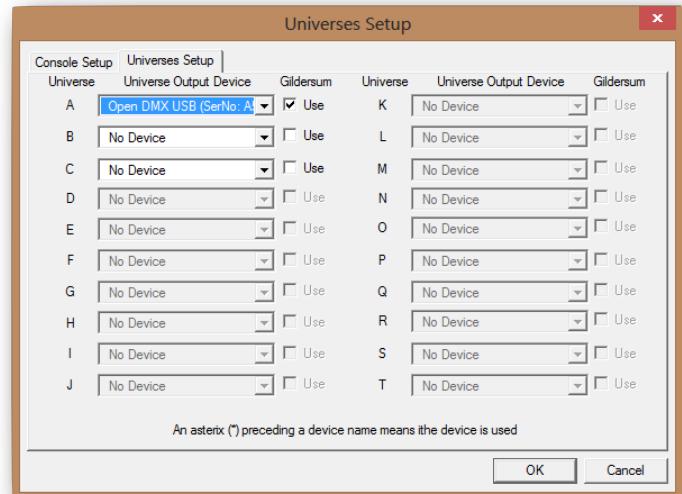
If using a Mackie Universal Pro, set the 'width' for eight inputs. If also using one, two or three of the expansions, set it to 16, 24 or 32.



## Universes...

This dialog is used to set up the DMX-512 outputs from Pc•MACs. In this example, the show that was used has three universes (1536 channels) worth of outputs. You can see that universes 'd' and above are greyed out. For each of the active universes, you can click on the drop-down and pick a DMX-512 interface to use.

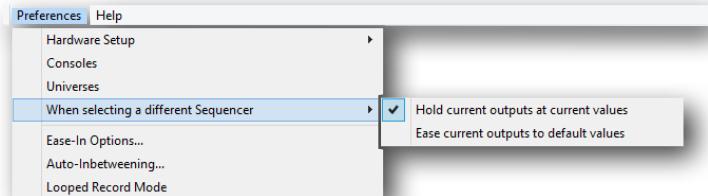
You don't need to connect all three universes simultaneously. You can plug in one, two or three DMX-512 interfaces to transmit any of the three active universes.



## When Selecting a Different Sequencer

When selecting a different sequencer for programming, Pc•MACs can set the outputs of the inactive sequencers to either their 'current' values, or their 'default' values, as set on the analog and digital setup dialogs.

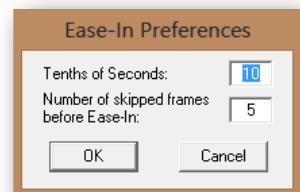
In either case, Pc•MACs will do an EaseIn on all the analog channels that are being enabled or disabled.



## EaseIn Options...

An EaseIn will be generated at any time Pc•MACs thinks it might cause the analog outputs to jump. If you have any analogs assigned and punched in on the programming console, the ramp will be generated on these inputs until the input crosses or equals the value of the output. At that point the EaseIn will be stopped for that individual channel.

This allows you to set the amount of time Pc•MACs will take to generate an EaseIn. The value is set in 10ths of seconds (i.e.: a value of ten equals one second.). This value is the worst case amount of time it would take to ramp any analog function from one extreme to the other.



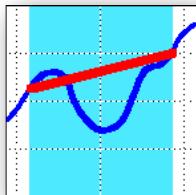
The ‘Number of Skipped Frames before Ease-In’ sets the number of frames of a jump forward or backwards in the timecode will trigger an Ease-In.

## Auto-Inbetweening...

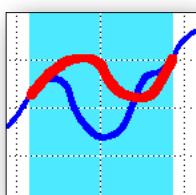
This command is used to set the various options Pc•MACs will use for Auto-Inbetweening analog channels. This is a feature you will rarely want to turn off.

Options for the Auto-Inbetweening are set individually for both the left (punch in) and right (punch out) sides of the edit. For each of these you can select what type of curve will be used and the number of frames before and after the punch point the ramps will effect. The Auto-Inbetweening curve options are:

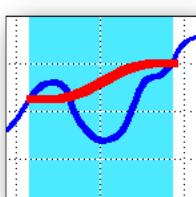
- a) **none:** This turns off this feature for one or both ends of the edit. The ‘jump’ will be unchanged.



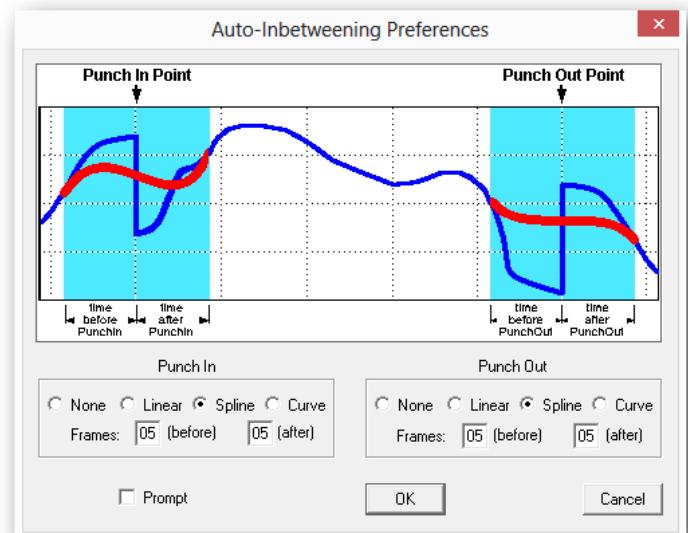
b)**Ramp:** This generates a dead straight line between each of the points. It is the most basic type of ramping available. This tends to make whatever the system is controlling look somewhat ‘robotic’. This is the only sort of curve that lighting boards and less sophisticated control systems can generate. With no acceleration or deceleration, this doesn’t give the movements the subtlety that it takes to make a show look like it is truly ‘alive’.



c)**Spline:** This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the effected area.



d)**Curve:** Like the Spline above, except that it doesn’t match the data before and after the effected area. This results in a simple ‘S’ curve.



There is also an option of having Pc•MACs prompt you before it cleans up any punches on its own. There is almost no reason to ever use this last option.

## Looped Record Mode

When this option is 'On', Pc•MACs will stay in 'Record' when a show is being looped. When it is 'Off', after the first pass in a loop, the 'Record' will revert back to a 'Playback'.

## Looped Rehearsal Mode

When this option is 'On', Pc•MACs will stay in 'Rehearsal' when a show is being looped. When it is 'Off', after the first pass in a loop, the 'Rehearsal' will revert back to 'Playback' on subsequent passes through loop.

## Auto Pause Enable

When this toggle is enabled, Pc•MACs will automatically pause playback when data in channel a256 is programmed with a non-zero value. Hitting the 'continue' button on the main control window will resume show playback from the point at which the show was paused.

This is typically used on film shoots or live stage shows where you are manually triggering a series of cues at specific points in the a live show.

Currently, the channels that triggers the paused is at a fixed address of 256 (one-based) in the first universe. Future versions of Pc•MACs will include the option of choosing the channel to be used to trigger pauses.

## Active Channel Mixing

When this option is 'On', Pc•MACs will use the Channel Mixing features. This is the only RealTime process that uses the PC's CPU to accomplish. If you are running on a slow PC, this feature may have to be disabled just to run Pc•MACs. If you are not using the Channel Mixer for a given project, you might as well leave it turned 'Off'.

## Mix During Playback

The mixer functions are normally active only during a 'Recording' mode and if sitting idle in 'Manual' mode. This toggle is used to turn it on when in 'Playback' mode as well.

If the **Mix During Playback** toggle is OFF, Pc•MACs will simply play back whatever is recorded on both the mixer input and output channels when ‘Playing’. The mixer will be completely inactive.

If the **Mix During Playback** toggle is ON, Pc•MACs will process the data in any channels that are designated as inputs to a mixer through to the outputs that are designated as the outputs of the mixer. The data in the outputs of the mixer will be a combination of the data recorded into all the mixer input channels. No recorded data is modified.

## Mix During Rehearsal

The mixer functions are normally active only during a ‘Recording’ mode and if sitting idle in ‘Manual’ mode. This toggle is used to turn it on when in ‘Rehearsal’ mode as well.

If the **Mix During Rehearsal** toggle is OFF, Pc•MACs will simply play back whatever is recorded on both the mixer input and output channels when ‘Rehearsal’ mode. The mixer will be completely inactive.

If the **Mix During Rehearsal** toggle is ON, you can control channels ‘live’, just like when you are in ‘Recording’ mode, except that the changed data isn’t saved.

Typically the mixer ‘input’ channels are assigned on the programming console so that you can perform a ‘live’ overlay into the other pre-recorded channels that are the destination of the mix. The output will typically be a combination of the pre-recorded data on the mixer ‘output’ channels, and the live operator on the console ‘input’ channels.

Pc•MACs will process the data in any channels that are designated as inputs to a mixer through to the outputs that are designated as the outputs of the mixer. The data in the outputs of the mixer will be a combination of the data recorded into all the mixer input channels. No recorded data is modified.

## Average Mixer Outputs

If the Averaging toggle is OFF, the analog channels that are mixed simply by adding them together. If you are mixing together two channels (at 100%/100%) into a single output, setting either input to 100% will set the output to 100%. If you set both inputs to 50%, the output will be at 100%. If you set both inputs to 100%, it will try to set the output to 200%, which will be limited to 100%.

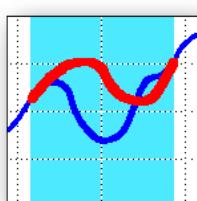
If the Averaging is ON, Pc•MACs looks at the number of inputs that are feeding into each output. If there are two inputs feeding an output, the sum of all the inputs will be divided by two before sending it to the output. Each input now has control of 50% of the output. To set the output to 100%, you will have to set both inputs to 100%. If there are three inputs feeding and output, it will divide by three before sending it to the outputs. Each input has 33.3% of the control over the output, and all three inputs will have to be set to 100% to drive the output to 100%. The same works averaging works for any numbers of inputs feeding one output.

## Inbetweening...

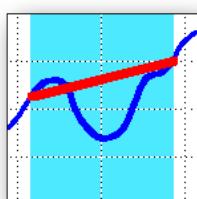
This command is used to set what type of curve (Ramp, Spline, or Curve) will be used for Inbetweening under the OffLine Editing Window.

To use the [Inbetweening command](#), you must select one or more analog channels for a stretch of time. When you invoke the Inbetweening command, the analog data in the selected area will be replaced by the selected type of curve (Ramp, Spline, or Curve).

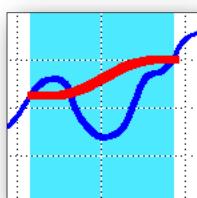
The options are:



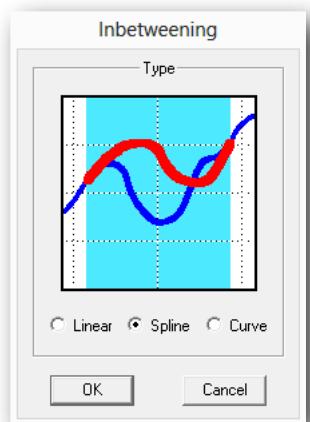
a)**Ramp:** This generates a dead straight line between each of the points. It is the most basic type of ramping available.



b)**Spline:** This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the effected area.



c)**Curve:** Like the Spline above, except that it doesn't match the data before and after the effected area. This results in a simple 'S' curve.



## Cut/Paste...

This command is used to set what type of curve (Ramp, Spline, or Curve) will be used for automatically cleaning up cuts and pastes in analog channels.

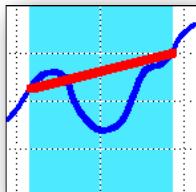
Options for the cut and paste cleanup are set individually for both the left (start) and right (end) sides of the edits. You can select what type of curve will be used (None, Ramp, Spline, and Curve) as well as the number of frames before and after the edit points the ramps will effect.

If you are pasting digital functions into analog channels, each time digital bit turns ON is treated as the start of an edit and the ‘start of edit’ setting will be applied to the analog output. When a digital bit turns OFF, it treats this as the end of an edit, and the ‘end of edit’ settings will be applied.

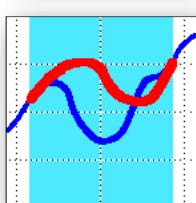
The options are:

a) **none:** This turns off this feature for one or both ends of the edit.

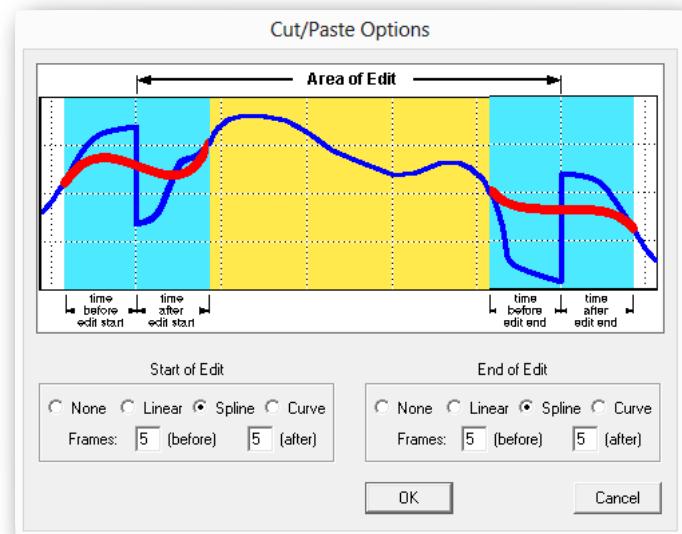
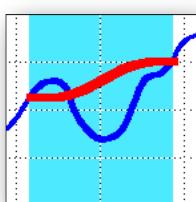
b)**Ramp:** This generates a dead straight line between each of the points. It is the most basic type of ramping available.



c)**Spline:** This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the effected area.



d)**Curve:** Like the Spline above, except that it doesn't match the data before and after the effected area. This results in a simple ‘S’ curve.



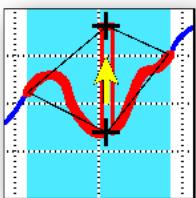
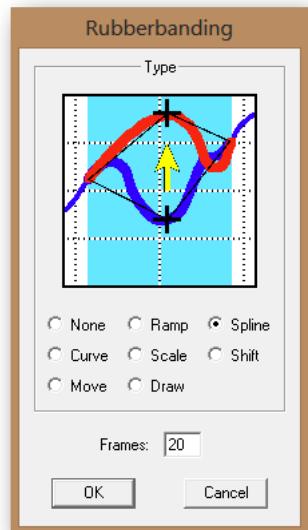
## Rubberbanding...

This command allows you to select what type of curve will be used for 'Rubberbanding' in the OffLine Editing Window.

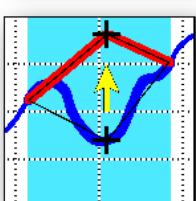
Rubberbanding is applied to either:

- a) The selected area of the OffLine Editing Window. This must all be within the visible area of the OffLine Editing Window. If the selection goes beyond the left and right edges of the OffLine Editing Window, those area will be ignored.
- b) If no area of the OffLine Editing Window has been selected, then it uses the number of frames entered on this dialog for the selected area. This allows you to just 'tap' on a glitch on an analog channel to instantly clean it up.

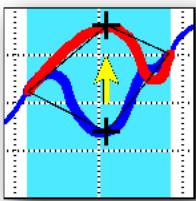
There are eight different options that can be selected of the Rubberbanding tool. The options are:



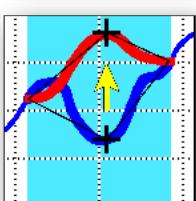
a)**None**: This is used when you just want to move the one point you select to a new value. This command will only move one frame's data, no matter the number of frames worth of time selected on the OffLine Editing Window.



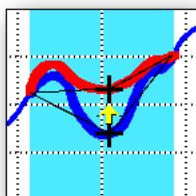
b)**Ramp**: This generates a dead straight line between each of the points. It is the most basic type of ramping available.



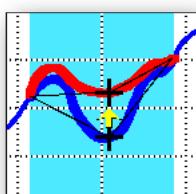
c)**Spline**: This is the most commonly used style of curve. It draws a curve across the selected area that matches its two ends into the data that is found before and after the effected area.



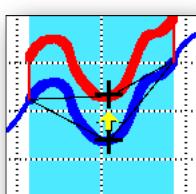
d)**Curve**: Like the Spline above, except that it doesn't match the data before and after the effected area. This results in a simple 'S' curve.



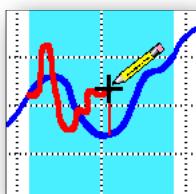
e)**Scale:** This setting expands a movement as you move the cursor further away from the default position for the channel. The amplitude of the movements is increased as they move away from the default position while those near the default position remains unchanged. This allows movements to be made more ‘exaggerated’ without changing the movements near the default position.



f)**Shift:** This setting moves the analog movement in the direction you move the mouse without effecting the amplitude of the movements. This is as if the movements were drawn along the road surface of a drawbridge. As you move the mouse up or down, the center of the bridge raises and lowers at the mouse point without effecting the amplitude of the data. The data at the hinge points at both ends of the bridge are barely effected.



g)**Move:** This setting allows you to move the entire selected area up or down with the mouse.

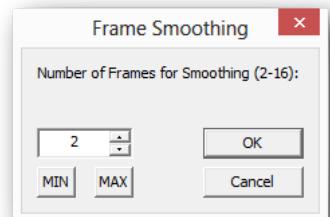


h)**Draw:** This setting allows you actually ‘draw’ the exact waveform you would like to see. A stretch of time must be selected on the OffLine Editing Window before you can draw anything.

If a range of time has been selected on the OffLine Editing Window, most of the rubberbanding settings will effect this selected area. If no area has been selected, then the default number of frames that will be effected is also set on this dialog.

## Smoothing Frames...

This command allows the user to enter the number of frames that will be averaged by the smoothing command under the OffLine Editing Window. A larger number will have a greater effect than a smaller one.



## Reload Current Show On Startup

This toggle, when ON, Pc•MACs will reload the last show you were working on the next time Pc•MACs is opened.

## Do Not Convert Audio Sync to Triggers

The older way of triggering Audio/Video files is to manually draw in your Audio/Video starts on their trigger channels, and use the Audio/Video sync on the '[File](#)' menu's '[Show Information....](#)' dialog (or '[New Show](#)' dialog).

The new (and preferred) way trigger Audio/Video files is to us the [drag-n-drop Audio/Video triggers](#) on the OffLine Editing Window. With these, Pc•MACs does most of the work for you.

If you have used (or updated) your [Channels List](#) to use 'Devices', Pc•MACs knows everything it needs to convert the old Audio/Video triggers to the new drag-n-drop triggers for every show that uses the same site file.

Whenever you open a show that Pc•MACs is ready to upgrade, it will ask if you would like to upgrade the single show (or all the shows in the folder), to use the new-style drag-n-drop triggers. When this toggle is ON, Pc•MACs stops asking about upgrading any show that uses this upgrade-ready site file.

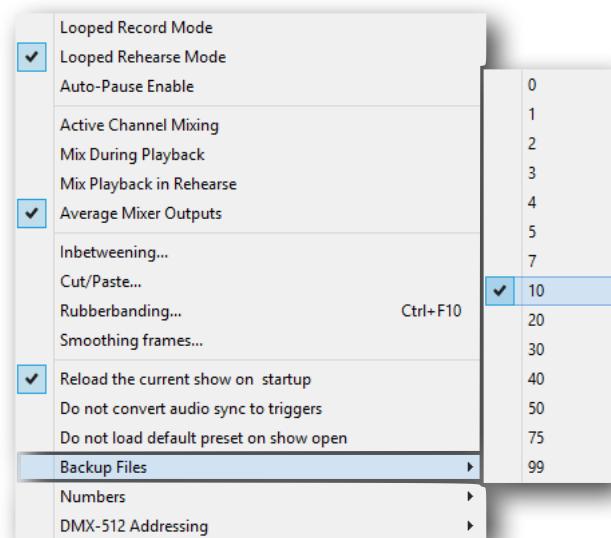
## Do Not Load Default Preset on Show Open

Pc•MACs will normally reload the last used programming console preset on startup. When this toggle is ON, Pc•MACs will NOT load the last used programming console preset when next started.

## Backup Files

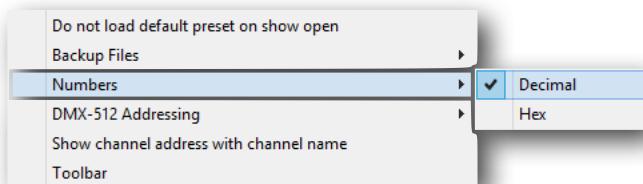
When this option is 'On', Pc•MACs will store an extra backup copy of the last saved version of your show each time you ask it to do a save. This secondary backup (with the extension .BAK) means that you will always have a copy of your last two most recently saved versions of the show you are working on.

If the '[Preferences](#)' menu's Backup Files option is 'On', the last two version of your show are saved. If you need to go back two versions, you will have to tab out of Pc•MACs and use Windows Explorer to rename the filename.BAK file to a filename.SHO file.



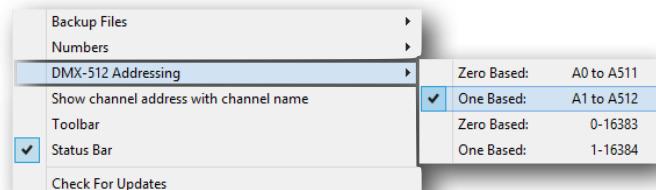
## Numbers

This is used to select whether Pc•MACs will use Decimal (0-9) or Hexadecimal (0-9, A-F) numbering. When creating default channel names, Pc•MACs will use the DMX-512 address of the output as a part of the default output name. Pc•MACs uses the current numbering system and DMX-512 address when doing this.



## DMX-512 Addressing

When DMX-512 networking started was first created, DMX-512 addresses were all '0' to '511'. This is what is called 'zero-based' (0-511) DMX-512 addressing. Some people had trouble wrapping their brains around the concept of 'zero' as a real number, so through the years, DMX-512 addresses have migrated to what is called 'one-based' (1 to 512) DMX-512 addressing.



There is really no difference internally between 'zero-based' (0-511) or the 'one-based' (1 to 512) DMX-512 addressing. Inside Pc•MACs, all DMX-512 addresses are stored as 'zero-based' (0-511) numbers. 'One-based' (1 to 512) addressing is really

just ‘zero-based’ (0-511) addresses, with ‘1’ added to the address number before it is displayed. Add ‘1’ to ‘zero-based’ (0-511) addresses, and they are displayed as ‘one-based’ (1 to 512). Subtract ‘1’ from ‘one-based’ (1 to 512) addresses, and they are displayed as ‘zero-based’ (0-511) addresses.

The vast majority of third party equipment today will be one-Based. All current GilderGear is one-based as well, or can be switched between one- and zero-based addressing as needed. Most older GilderGear will be zero-based.

## Show Channel Address with Channel Name

When ON, Pc•MACs will append the DMX-512 address to the front of all the channels names. This can be useful when your are setting up a large show and confirming that all the lights and output hardware is addressed properly. Once you get further into programming, you will no longer need to know the underlying DMX-512 addresses, and will probably turn this feature off.

## Tool Bar

This command allows the user to toggle on and off the tool bar at the top of the screen. The Tool bar contains several of Microsoft’s indecipherable hieroglyphics at the top of the screen. You may want to turn this off if you are working on a smaller screen. On larger screens it is mostly harmless.

## Status Bar

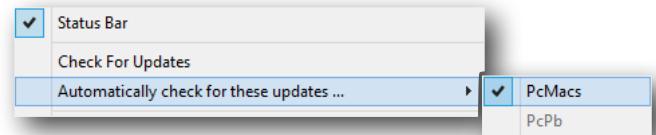
This command allows the user to toggle on and off the Status Bar at the bottom of the screen. The status Bar tells you what the commands you just entered just did, the status of several keyboard keys, and several other pretty useless things. You may want to turn this off if you are working on a smaller screen. On larger screens it is mostly harmless.

## Check For Updates Now

If your computer is on the internet, Pc•MACs will check with the servers at Gilderfluke & Co. to see if there is a new version of Pc•MACs available. If there is, then Pc•MACs can download and update itself. When it has finished, you will need to quit and restart Pc•MACs to start using the new version.

## Automatically Check for These Updates...

If your computer is on the internet, you can tell Pc•MACs to check for new versions of itself and Pc•Pb every week. If it finds new versions, Pc•MACs can download and update itself. When it has finished, you will need to quit and restart Pc•MACs to start using the new version.





## Pc•MACs DLL Details

!!!! DLLs are the special programs called by other programs within a Windows environment. Pc•MACs includes four DLLs which can be modified to customize the data for your specific applications. You can add filtering, mixing, or animatics to a Pc•MACs system, or use these DLLs to import or export data to MIDI, other animation systems, networking media (like Ethernet), graphic programs, or file formats.

There are up to seven DLLs in the Pc•MACs system. These are:

- 1) Before the data is sent to the Programming Console (MACSDLL1.DLL)
- 2) After the data has been returned from the Programming Console (MACSDLL2.DLL)
- 3) Before the data is sent to the outputs (MACSDLL3.DLL)
- 4) Before data is sent to Eprom file(s) (MACSDLL4.DLL)

Pc•MACs processes each frame of animation data as a single block of two hundred fifty-six, eight bit bytes. It doesn't care how you have divided this data up between digital functions (which use one bit each) and analog functions (which may use eight, twelve, sixteen, twenty-four or thirty-two bits each). Pc•MACs sends all two hundred fifty-six bytes of data to each of the DLLs. The DLLs can do whatever is needed to this data, and then pass it back to Pc•MACs. In the vast majority of applications, these DLLs will be blank. Pc•MACs will call them to say 'hello', but they don't modify data in any way. If Pc•MACs doesn't find any DLLs it wants, it will turn them off.

If you need to modify the DLLs, the source code for the blank ones are available for modification from Gilderluke & Co.. These can be ordered from us directly. If you need the DLLs modified by us, this can be done for a one-time modification price.

The first two DLLs are used in applications where you need to 'mix' analog channels before they are stored. The first one 'unmixes' data into discrete channels before it is sent to the console. The second one mixes together whatever was returned from the console. The show data which is stored will include all of the mixed functions. This mixed data is what you will see when you edit the data on the OffLine Editing Window.

The Third DLL can be used for mixing when you want to store and edit the 'raw' data. Data is passed to this DLL after it has been stored (if in Record) and just before it gets sent out to the real world. This DLL can also be used if you want to reroute the data from a Pc•MACs system to some other output device within the PC. An example of this would be if you wanted to route the data out through an Ethernet connection. This DLL can also be used in motion base applications to transform individual 'axis' information

into individual ‘leg length’ data that the motion base needs to operate. This is typically referred to as ‘animatics’ or ‘kinematics’.

The final DLL is called only when you are saving a show into Eproms. If you are using DLL #3 above, the data is stored as ‘raw’ unprocessed data. When time comes to burn this data into Eproms for use in the permanent installation, you will want the data to contain all of the processing. That is what this DLL is used for. Since it is replaying preprocessed data, the playback system doesn’t need the horsepower it would take to process this data in real-time. This DLL is usually identical to DLL #3.

The first three DLLs are time critical. They are called from interrupt routines in PCMACS. This requires careful coding to avoid re-entrancy issues. The ‘Bill Gates’ solution<sup>21</sup> may solve some problems with a DLL that runs too slowly.

Processing in the DLL should be as efficient as possible. This is a general principle of interrupt coding. If the code takes too long to execute the interrupt may be triggered again. This can cause unpredictable problems like system hangs and crashes. In addition, there are functions which might be called from the foreground while it is being executed in the DLL, a crash may result. Most Windows API calls fall into this category. The documentation on the Windows API can give more information on which functions are interrupt-safe by virtue of being coded in a re-entrant fashion. In the Multimedia Reference Guide the following API calls are described as being safe for low-level callbacks: PostMessage, timeGetSystemTime, timeGetTime, timeSetEvent, timeKillEvent, midiOutShortMsg, midiOutLongMsg, and OutputDebugStr.

The bottom line is really that if you insert processing which is not safe, you’ll probably discover it fairly quickly!

## Finding Software Revision Numbers

The date and revision number for the copy of Pc•MACs you are running can be found under the Help menu’s About command.

---

21 “Just get a faster computer” -- Bill Gates

## Adding Your Own Devices to the GearList

!!!! When you are adding ‘by devices’, Pc•MACs is looking up the ‘Devices’ in one of two files. The GilderGear.gear file is used for defining the equipment made by Gilderluke & Co.. The GearList.gear file is used for defining third party hardware.

The GearList.gear is a simple text file, and it is user editable. This allows you to easily add any devices that you need to use regularly to the GearList.

This could be a piece of lighting hardware, or a ‘stock’ animated figure or water feature that you manufacture. There have been cases where we were programming a show with a dozen or so identical animated figures. Instead of defining each figure channel-by-channel, we added one of these figures to the GearList.gear, and used the ‘Add Multiple Devices...’ command to add them all to the [Channels List](#) with only a couple of mouse clicks.

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# Preparing for High Speed Serial Communications

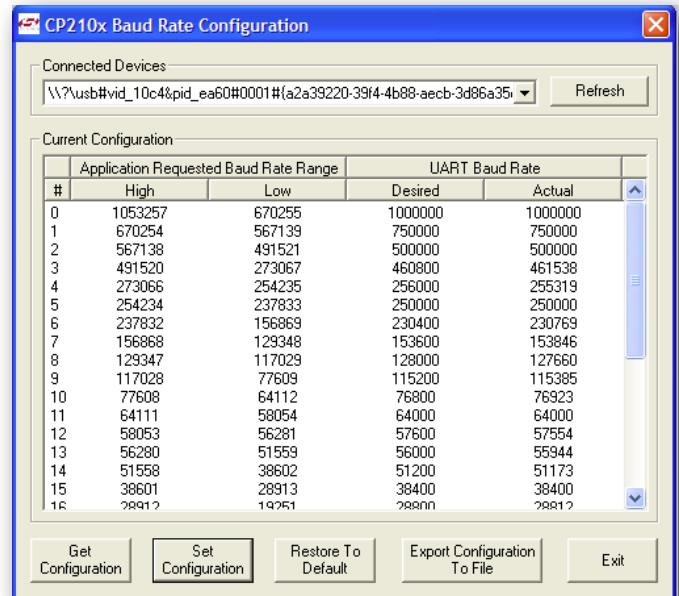
!!!! You can set the baud rate which Pc•MACs uses to talk to the Br-Brain4 on the '[Preferences](#)' menu's '[Hardware/Serial Port Interface....](#)' dialog. Just setting it here will change the baud rate to match on the attached Br-Brain4. You can see this happening if you set the LCD on the front of the Br-Brain4 to display the primary serial port's baud rate.

By default, the 1Mbaud rate on your [USB-RS232/422](#) will actually be at 921,600. To go all the way to 1MBaud, you will need to run the Silicon Labs 'BaudRateAliasConfig.exe' utility, and change the baud rate entry to an actual 1MBaud. You will only need to do this once for each [USB-RS232/422](#) that you have.

The app note for aliasing the baud rates for the Cp2102 is here:

The baud rate alias application is here:

Just change the top baud rate to 1,000,000 baud on your [USB-RS232/422](#) adapter. The BaudRateAliasConfig.exe screen should look like this when you are done:



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## HEXadecimal to Decimal to Percentage

The following chart shows decimal, HEXadecimal, and a few percentage equivalents to aid you when you need to convert between numbering bases:

decimal	HEX	ASCII	%	decimal	HEX	ASCII	%	decimal	HEX	ASCII	%	decimal	HEX	ASCII	%
00	00	null	0	64	40	@	25%	128	80	(null)	50%	192	C0	(@)	75%
1	01	soh/^A		65	41	A		129	81	(soh)		193	C1	(A)	
2	02	stx/^B		66	42	B		130	82	(stx)		194	C2	(B)	
3	03	etx/^C		67	43	C		131	83	(etx/)		195	C3	(C)	
4	04	eot/^D		68	44	D		132	84	(eot)		196	C4	(D)	
5	05	eng/^E		69	45	E		133	85	(eng)		197	C5	(E)	
6	06	ack/^F		70	46	F		134	86	(ack)		198	C6	(F)	
7	07	bell/^G		71	47	G		135	87	(bell)		199	C7	(G)	
8	08	bs/^H		72	48	H		136	88	(bs)		200	C8	(H)	
9	09	ht/^I		73	49	I		137	89	(ht)		201	C9	(I)	
10	0A	lf/^J		74	4A	J		138	8A	(lf)		202	CA	(J)	
11	0B	vt/^K		75	4B	K		139	8B	(vt)		203	CB	(K)	
12	0C	ff/^L		76	4C	L		140	8C	(ff)		204	CC	(L)	
13	0D	cr/^M		77	4D	M		141	8D	(cr)		205	CD	(M)	
14	0E	so/^N		78	4E	N		142	8E	(so)		206	CE	(N)	
15	0F	si/^O		79	4F	O		143	8F	(si)		207	CF	(O)	
16	10	dle/^P		80	50	P		144	90	(dls)		208	D0	(P)	
17	11	dc1/^Q		81	51	Q		145	91	(dc1)		209	D1	(Q)	
18	12	dc2/^R		82	52	R		146	92	(dc2)		210	D2	(R)	
19	13	dc3/^S		83	53	S		147	93	(dc3)		211	D3	(S)	
20	14	dc4/^T		84	54	T		148	94	(dc4)		212	D4	(T)	
21	15	nak/^U		85	55	U		149	95	(nak)		213	D5	(U)	
22	16	syn/^V		86	56	V		150	96	(syn)		214	D6	(V)	
23	17	etb/^W		87	57	W		151	97	(etb)		215	D7	(W)	
24	18	can/^X		88	58	X		152	98	(can)		216	D8	(X)	
25	19	em/^Y		89	59	Y		153	99	(em)		217	D9	(Y)	
26	1A	sub/^Z		90	5A	Z		154	9A	(sub)		218	DA	(Z)	
27	1B	ESC		91	5B	[		155	9B	(ESC)		219	DB	(\)	
28	1C	FS		92	5C	\		156	9C	(FS)		220	DC	(\)	
29	1D	GS		93	5D	]		157	9D	(GS)		221	DD	(\)	
30	1E	RS		94	5E	^		158	9E	(RS)		222	DE	(^)	
31	1F	VS		95	5F			159	9F	(VS)		223	DF	( )	
32	20	SP	12.5%	96	60	'	37.5%	160	A0	(SP)	62.5%	224	E0	(`)	87.5%
33	21	!		97	61	a		161	A1	(!)		225	E1	(a)	
34	22	"		98	62	b		162	A2	(")		226	E2	(b)	
35	23	#		99	63	c		163	A3	(#)		227	E3	(c)	
36	24	\$		100	64	d		164	A4	(\\$)		228	E4	(d)	
37	25	%		101	65	e		165	A5	(%)		229	E5	(e)	
38	26	&		102	66	f		166	A6	(&)		230	E6	(f)	
39	27	'		103	67	g		167	A7	(')		231	E7	(g)	
40	28	(		104	68	h		168	A8	(( ))		232	E8	(h)	
41	29	)		105	69	i		169	A9	(())		233	E9	(i)	
42	2A	*		106	6A	j		170	AA	(*)		234	EA	(j)	
43	2B	+		107	6B	k		171	AB	(+)		235	EB	(k)	
44	2C	,		108	6C	l		172	AC	(`)		236	EC	(\)	
45	2D	-		109	6D	m		173	AD	(-)		237	ED	(m)	
46	2E	.		110	6E	n		174	AE	(•)		238	EE	(n)	
47	2F	/		111	6F	o		175	AF	(/)		239	EF	(o)	
48	30	0		112	70	p		176	B0	(0)		240	F0	(p)	
49	31	1		113	71	q		177	B1	(1)		241	F1	(q)	
50	32	2		114	72	r		178	B2	(2)		242	F2	(r)	
51	33	3		115	73	s		179	B3	(3)		243	F3	(s)	
52	34	4		116	74	t		180	B4	(4)		244	F4	(t)	
53	35	5		117	75	u		181	B5	(5)		245	F5	(u)	
54	36	6		118	76	v		182	B6	(6)		246	F6	(v)	
55	37	7		119	77	w		183	B7	(7)		247	F7	(w)	
56	38	8		120	78	x		184	B8	(8)		248	F8	(x)	
57	39	9		121	79	y		185	B9	(9)		249	F9	(y)	
58	3A	:		122	7A	z		186	BA	(:)		250	FA	(z)	
59	3B	,		123	7B			187	BB	(:)		251	FB	( )	
60	3C	<		124	7C			188	BC	(<)		252	FC	( )	
61	3D	=		125	7D			189	BD	(=)		253	FD	( )	
62	3E	>		126	7E	~		190	BE	(>)		254	FE	(~)	
63	3F	?		127	7F	del		191	BF	(/)		255	FF	(del)	100%