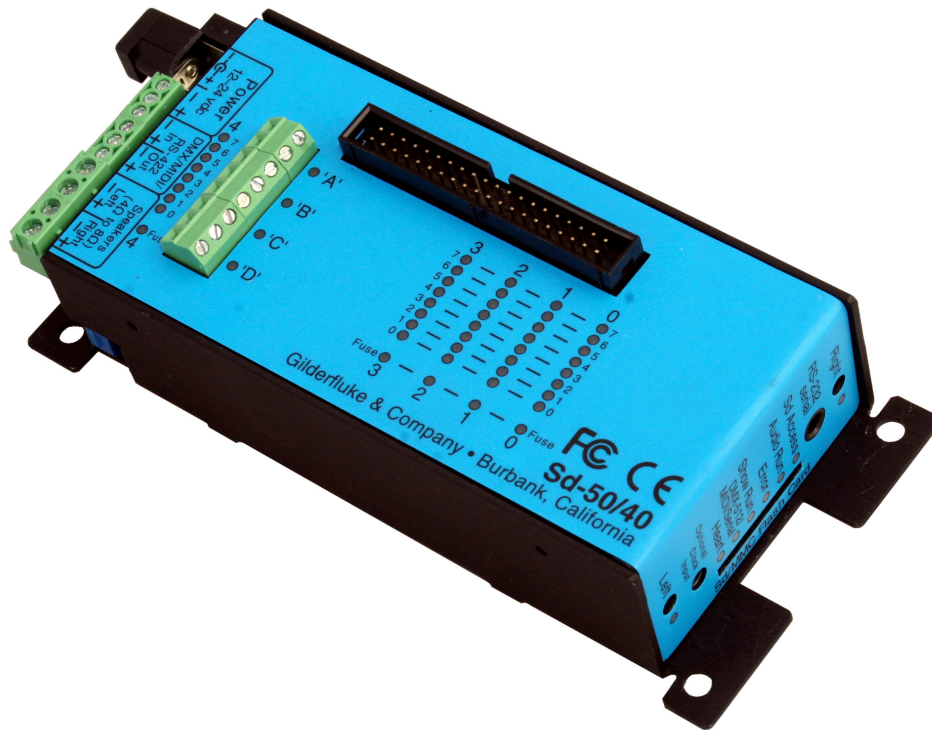


Sd-50/0, Sd-50/8, Sd-50/40

Audio & Show Control Systems



The **Sd-50/0** is a complete, stand alone .Mp3/.wav player system. Just add a power supply and your speakers, and it will play audio from the Sd flash card.

The **Sd-50/8** & **Sd-50/40** add up to forty digital Show Control outputs, [DMX-512](#), [MIDI](#) or [Net Serial](#) RS-422 serial port input, [DMX-512 output](#) and 365 day scheduling to an **Sd-50/0** player. The **Sd-50/8** & **Sd-50/40** are complete audio *and* Show Control solutions.

The **Sd-50/GPS8** & **Sd-50/GPS40** adds a GPS receiver for 1/1000 second accuracy when triggering by time. This gives you 'Atomic' clock accuracy for carillons, schools, churches, bell towers & industrial annunciator systems.

Safety Disclaimer: Any electronic or mechanical system has a potential to fail. Certain applications using Gilderfluke & Company equipment may involve potential risks of death, personal injury, or severe property, or environmental damage (“Critical Application”). Gilderfluke & Company equipment is not designed, intended, authorized, or warranted to be suitable in life support applications, devices, or systems, or other critical applications. Inclusion of Gilderfluke & Company products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

Gilderfluke & Company assumes no liability for applications assistance, customer produced design, software performance, or infringement of patents or copyrights. Nor does Gilderfluke & Company warrant or represent that any license, either express, or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of Gilderfluke & Company covering or relating to any combination, machine, or process in which Gilderfluke & Company products or services might be or are used.

Getting Started with an Sd-50/8 or Sd-50/40 (quickly).....	10
Starting a New Show in Pc•MACs:.....	10
Open Pc•MACs:	10
Select 'new' show from under Pc•MACs' 'File' menu:	10
Select a 'new' or existing 'Site' file:	11
Close the 'New Show' dialog / Open the 'Channels List' dialog:	11
Select the 'Add Device with Channels' command:	12
Triggering Audio/Video Files:.....	13
Add a Trigger:	13
Programming Your Show:.....	14
AutoDownloading Shows:.....	15
Open the 'Save to AutoDownload' dialog:	15
Pick the 'Target Device' for this AutoDownload:	15
Pick the Range of Channels for this AutoDownload:	15
Pick the 'Shows to AutoDownload to Target Device':	15
Set what the Target Device does on StartUp:	15
Set what the Target Device does on each Trigger Input:	16
Build your AutoDownload file:	16
Close the AutoDownload dialog:	16
Updating Older Shows:.....	18
Archive Your Existing Shows:	18
Open the 'Channels List' Dialog:	19
View by 'Devices':	19
'Add devices without channels':	19
Move Existing Audio/Video Trigger Channels into the Appropriate 'Devices':	20
Tell Pc•MACs that this is an ' Audio/Video Trigger':	20
Save and 'Convert Audio/Video Sync':	21
Getting Started with an Sd-50/0 (quickly).....	22
Sd-50/0, Sd-50/8 or Sd-50/40 Overview.....	25
Features of the Sd-50/0 include:.....	25
Features the Sd-50/8 and Sd-50/40 adds includes.....	27
Differences between Sd-50s and Mp3-50s.....	30
Sd-50/0 Sd-50/8 or Sd-50/40 Indicators.....	32
Right (Sd-50/0, Sd-50/8, Sd-50/40).....	33
Sd Access (Sd-50/0, Sd-50/8, Sd-50/40).....	33
Audio Run (Sd-50/0, Sd-50/8, Sd-50/40).....	33
Board Error (Sd-50/0, Sd-50/8, Sd-50/40).....	33
Show Run (Sd-50/8, Sd-50/40).....	33
DMX/MIDI/Serial (Sd-50/8, Sd-50/40).....	33
Heart (Sd-50/0, Sd-50/8, Sd-50/40).....	34
Left (Sd-50/0, Sd-50/8, Sd-50/40).....	34
Fuses (1 LED on Sd-50/8, 5 LEDs on Sd-50/40).....	34
J8 'A', 'B', 'C', & 'D' Input LEDs (Sd-50/8, Sd-50/40).....	34
Output LEDs (8 LEDs on Sd-50/8, 40 LEDs on Sd-50/40).....	34
Input Open (Sd-50/0).....	35
Input Close (Sd-50/0).....	35
Sd-50/0, Sd-50/8 or Sd-50/40 Connections.....	36
RS-232 Serial Port (Sd-50/0, Sd-50/8, Sd-50/40).....	37

Sd Socket (Sd-50/0, Sd-50/8, Sd-50/40)	37
Optional Clock Input (Sd-50/8, Sd-50/40)	38
Card Cage Connection (Sd-50/0, Sd-50/8, Sd-50/40)	38
Power Supply (Sd-50/0, Sd-50/8, Sd-50/40)	38
DMX-512/MIDI/Net Serial In (Sd-50/8, Sd-50/40)	39
DMX-512 Input	39
MIDI Notes Input	40
Net Serial Input	41
IR Input Mode	41
IR MultiLingual Mode	43
None	44
DMX-512 Output (Sd-50/8, Sd-50/40)	45
Left Speaker Output (Sd-50/0, Sd-50/8, Sd-50/40)	45
Right Speaker Output (Sd-50/0, Sd-50/8, Sd-50/40)	45
Left Line Output (Sd-50/0, Sd-50/8, Sd-50/40)	46
Right Line Output (Sd-50/0, Sd-50/8, Sd-50/40)	46
‘¼ J6’ Inputs/Outputs (Sd-50/0, Sd-50/8, Sd-50/40)	46
Outputs via the ‘¼ J6’ port	47
Inputs via the ‘¼ J6’ port	47
ServoMotor PWM via the ‘¼ J6’ port	48
J8 ‘A’, ‘B’, ‘C’ & ‘D’ inputs (Sd-50/8, Sd-50/40)	49
J8 ‘A’, ‘B’, ‘C’ & ‘D’ Binary:	50
‘J6’ Show Control Outputs (Sd-50/40)	52
Defaults for Sd-50/0s, Sd-50/8s and Sd-50/40s	56
Sd-50/0 (audio only) Defaults	56
Sd-50/8 Defaults	57
Sd-50/40 Defaults	58
What You Should And Shouldn’t See	59
Shows Capacities for Sd-50/8s and Sd-50/40s	61
What To Do With A New Sd Flash Card	64
Locking Your Data	66
Sd-50/0, Sd-50/8 or Sd-50/40 Serial Commands	67
Echo Commands:	68
Echo On: “a” [nn] (card address)	68
Echo Off: “b”	68
Card Status: “i” [nn] (card address)	68
Card Reset: “j5AA5” [nn] (card address)	70
Start Commands	70
Start Track: “t” [nn] (card address)	70
Start Global: “u”	70
Stop Commands	71
Stop Track: “x” [nn] (card address)	71
Stop Global: “y”	71
Loop Commands	71
Loop Track: “!” [nn] (card address)	71
Loop Global: “”	71
Stop at End Commands	71

Stop at End Track: “%” [nn] (card address)	71
Stop at End Global: “&”	71
Select Show Commands	71
Select Show Track: “)” [nn] (Card Address) [nn] (show#)	71
Select Show Global: “*” [nn] (show#)	71
Select & Play Sound Commands	72
Select Sound Track: “^t” [nn] (Card Address) [nn] (sound#)	72
Select Sound Global: “^u” [nn] (sound#)	72
Volume Command: “^v” [nn] (Card Address) [vv] (Volume)	72
Show Pause Commands	72
Pause Show: “<” [nn] (card address)	72
Continue Show: “>” [nn] (card address)	72
AutoDownload: “sA5A5” [nn] (card address)	73
RealTime Update: “~”	73
Serial Command Summary	74
Sd-50/0, Sd-50/8 or Sd-50/40 Hardware Config	75
‘1/4 J6’ Internal/External Power.....	75
RS-422/Optoisolated.....	75
Right Volume Control.....	75
Left Volume Control.....	75
Sd-50/0, Sd-50/8 or Sd-50/40 Serial Configuration	76
Entering Serial Configuration.....	77
Play a Sound.....	80
Stop Sound.....	80
Daylight Savings Time.....	80
Stop at End.....	81
Set Time.....	81
Show Info.....	82
Loop a Show.....	82
Display Config. from Sd.....	82
Reload Defaults.....	82
Play a Show.....	83
Stop Show.....	83
Set ServoMotor Endpoints.....	83
Verify Shows.....	84
Exit.....	85
Set Time Zone.....	85
Secondary Configuration Menu	86
Serial Address.....	86
MIDI channel.....	87
MIDI 1st Note.....	87
MCU Control Channel.....	87
Left Level Control.....	87
Right Level Control.....	87
First Show Control Output Channel.....	87
First ServoMotor Channel.....	87
eeFlag0.....	88
Play a Sound.....	88
Stop Sound.....	88

eeFlag1.....	88
eeFlag2.....	88
Stop at End.....	88
eeFlag3.....	89
eeFlag4.....	89
eeFlag5.....	89
Show Info.....	89
Loop a Show.....	89
Display Config. from Sd.....	90
Reload Defaults.....	90
Play a Show.....	90
Stop Show.....	90
Verify Shows.....	90
Exit.....	90
Set Time Zone.....	90
Sd-50/0, Sd-50/8 or Sd-50/40 Software Installation.....	92
Software/Firmware Versions.....	93
Updating Firmware on an Sd-50/0, Sd-50/8 or Sd-50/40.....	94
Manual Configuration using ‘SdConfig.exe’	95
Track Setup.....	98
Move Up.....	98
Move Down.....	98
Reload Track List From Directory.....	98
At End.....	98
Stop.....	99
Play Next Higher Selection.....	99
Play Random Selection.....	99
Play Same Selection Again.....	99
Play Specific SoundFile.....	99
Can Stop On Track with a new Play request.....	99
Track to Play at PowerUp.....	100
PlayList Setup.....	101
Audio Setup.....	102
Main Volume Level.....	102
Half Mute.....	102
RealTime Level Control.....	103
EQ Settings.....	103
Enable Power Amplifier.....	103
¼ J6’ Input Setup.....	104
Playback Level.....	106
Do not change Playback Level.....	106
Fade to Full In.....	106
Fade to Zero In.....	106
Fade to ‘Half Mute’ In.....	106
Start Playing.....	106
Whatever is Next.....	107
Next Higher Show or SoundFile.....	107
The Same Show or SoundFile Again.....	107

A Random Show or SoundFile	107
Specific Show or SoundFile	107
Stop Playing	107
Stop Now	108
Stop at End	108
Pause or Resume	108
Do not Start or Stop Anything	108
MCU Input Setup	109
Playback Level	110
Do not change Playback Level	110
Fade to Full In	110
Fade to Zero In	111
Fade to 'Half Mute' In	111
Start Playing	111
Whatever is Next	111
Next Higher SoundFile	111
The Same SoundFile Again	111
A Random SoundFile	112
Specific SoundFile	112
Stop Playing	112
Stop Now	112
Stop at End	112
Pause or Resume	112
Do not Start or Stop Anything	112
Animation Control Setup	113
DMX/MIDI/Serial Port Setup	113
Disable Serial Reception	113
Enable DMX-512 Reception	113
Enable DMX-512 Checksums	114
Enable MIDI Reception	114
MIDI Notes Trigger Animation Playback	114
MIDI Channel Number	115
MIDI First Note Number	115
Net Serial Mode	115
IR Trigger Mode	115
Brick Address	117
Repeater MCU Control Channel	117
First Animation Channel	117
First Servo Channel	117
Flash Setup	117
Enable Animation From Flash	118
Disable Outputs When Stopped	118
Write Protect Flash Memory	118
Schedule Setup	119
Disable Schedule Starts on 'D'/White Input	121
Daylight Savings Time & Time Zone Setup	122
Daylight Savings Time	122
Time Zone	122
Automatically Correct for Daylight Savings Time Changes	123
Display GPS Lock Status	123

Sd-50/0, Sd-50/8, and Sd-50/40 Installation.....	124
Battery Replacement on an Sd-50/8 or Sd-50/40.....	125
Care & Feeding of an GPS Receiver.....	126
C-50Trans Transition Connector.....	127
Sd-50/CC-10 Card Cage.....	128
FCC and CE Compliance:	130
EC DECLARATION OF CONFORMITY	130
HEXadecimal to Decimal to ASCII to Percentage.....	131

A note about this manual:

This manual covers the specifics of the **Sd-50/0, Sd-50/8, Sd-50/40**. To program the **Sd-50/0, Sd-50/8, Sd-50/40** you will also want to refer to the **PC•MACs** manual sections that cover the **PC•MACs** software.

The **Sd-50/0, Sd-50/8, Sd-50/40** are typically programmed in 'Software-only' or 'Hardwareless RealTime' mode. If you are using the **MACs-License** and **USB-DMX512 Adapter** for programming your **Sd-50/0, Sd-50/8, Sd-50/40** through the DMX-512 inputs, please refer to the **PC•MACs** 'Licensed' mode.

The full **PC•MACs** manual can be downloaded from our web site at:

<http://www.gilderfluke.com>

Getting Started with an Sd-50/8 or Sd-50/40 (quickly)

The following instructions describe how to quickly let the latest versions of Pc•MACs set up and configure an Audio/Video device like an **Sd-50/8** or **Sd-50/40** for you. This requires that you use a version of Pc•MACs that supports the new drag-n-drop Audio/Video triggers (later than PcMACs 2.0.216.1). This is available from the [Software/Drivers](#) page on the [Gilderfluke & Co. website](#) for download.¹

If you are using an **Sd-50/8** or **Sd-50/40**, you may want to connect it to a pair of speakers and a power supply. For testing, you don't need to actually connect to whatever you are eventually going to be controlling. If you just want the LEDs on the **Sd-50/8** or **Sd-50/40** blink, you can just power it up, program and then load your shows and watch the LEDs when you run them.

The following instructions cover creating up a show, but only minimal instructions on the actual programming of the show once it has been created. A primer on programming the show can be found in the PC•MACs manual or in our [GilderYouTube](#) video tutorials. [Connections](#) for the Show Control outputs can be found elsewhere in this manual. If you just want to watch the LED indicators for the Show Control Outputs blink, you can skip connecting your **Sd-50/8** or **Sd-50/40** to your show for now.

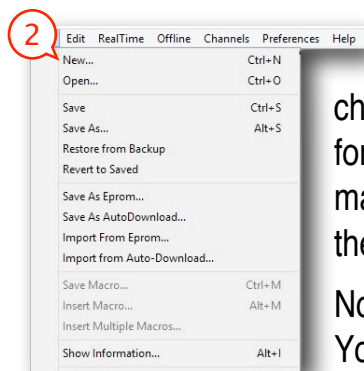
Starting a New Show in Pc•MACs:

To start a new Pc•MACs show for an **Sd-50/8** or **Sd-50/40**, just take the following five steps:

1) Open Pc•MACs:

You can do this by double clicking on Pc•MACs icon or the shortcut it left on your desktop during the installation.

2) Select 'new' show from under Pc•MACs' 'File' menu:

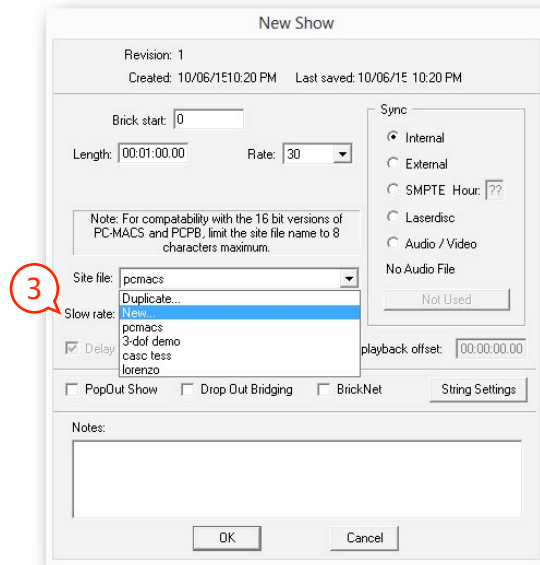


This will open the 'New Show' dialog. There aren't too many things that need to be set here, and anything you do set can be changed later by accessing the 'Show Information' dialog. Except for its name, the 'New Show' dialog is identical to the 'Show Information' dialog. The 'Show Information' dialog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

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.

¹ Once the software or firmware has been added to your cart, you can hit the 'checkout' button (which is hidden in the lower margin of the window). The web page makes it look like you are buying something when all you need to do is a download. Just set the 'shipping' to 'download' when you are checking out and our web page will send the latest version of Pc•MACs to you gratis.

3) 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 unique '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 use it again on another installation.

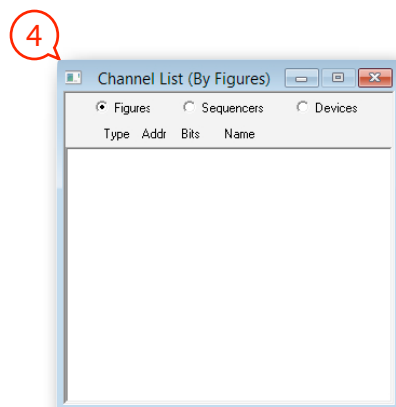
All the shows that run at a 'Site' should use the same 'Site' file. This saves you from re-entering the same stuff each time you start a new show. If you modify or add a preset, change the name of an output, or anything else, it will instantly and automatically be applied to all other shows which use 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, or if you scroll to the top of the list, you can enter a 'New' site file name or 'Duplicate' the current 'Site' file.

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.

Just leave the 'sync' radio buttons set for 'internal'. Although this is where we used to select the audio or video file to use, it is now easier to do on the OffLine Editing Window,

4) Close the 'New Show' dialog / Open the 'Channels List' dialog:



If you are using an existing 'Site' file that is already set up for your **Sd-50/8** or **Sd-50/40** and the new drag-n-drop Audio/Video triggers, you can skip down to 'Triggering Audio/Video files'.

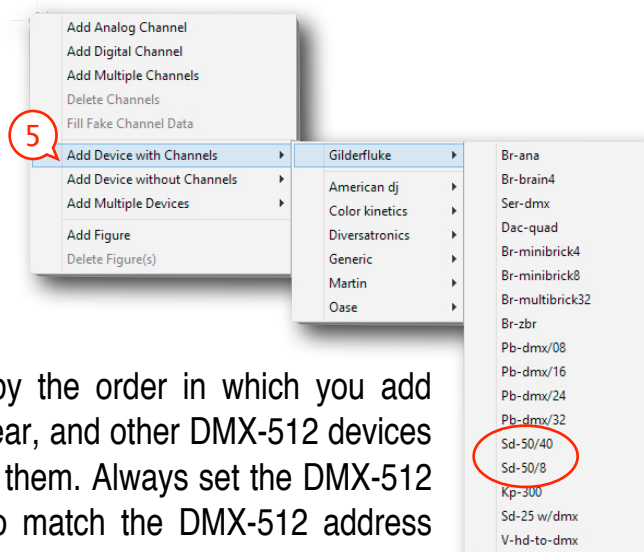
If you are using a new 'Site' file for this show, when you close the 'New Show' dialog, the 'Channels List' will automatically open. It will be very empty (see at left). The next step is to fill it in (see next page)...

In all the following 'Channels List' commands, you can use the command from the 'Channels' menu, or just

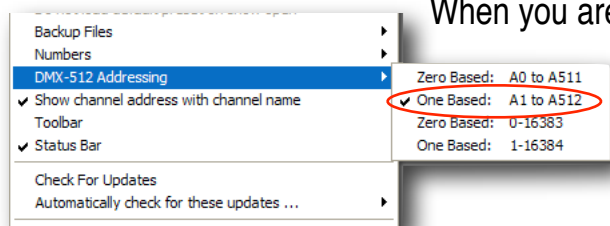
right+click in the Channels List and pick the command from the contextual menu that will magically appear.

5) Select the ‘Add Device with Channels’ command:

Slide over to pick whatever GilderGear and third party hardware you need in your show. Repeat this as needed. At least one of these devices should be the **Sd-50/8** or **Sd-50/40** you are programming. 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 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. 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.

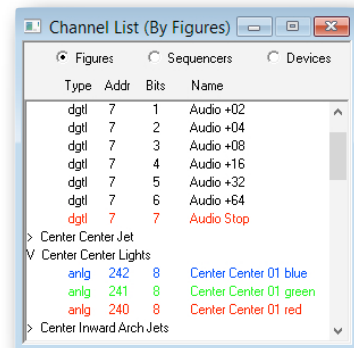


When you are setting the DMX-512 addresses of any lighting gear, you will want to set the DMX-512 addressing to ‘one-based’ (1 to 512) at the bottom of the ‘Preferences’ menu.

To help you keep your Channels List orderly, you can use the ‘Add Figure’ command to create folders, and drag and drop individual outputs or entire figures into it.

Folders can now 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.



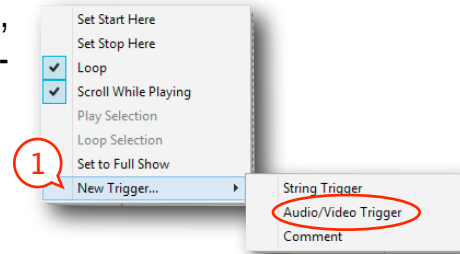
Triggering Audio/Video Files:

The biggest single change in Pc•MACs from the v.199 version is that it will do virtually all the work for you when triggering Audio and Video files. We call these drag-n-drop Audio/Video triggers.

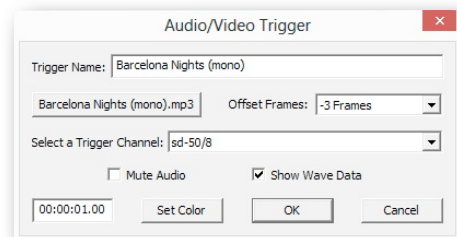
1) Add a Trigger:

To add a drag-n-drop Audio/Video trigger to a show, just open the OffLine Editing Window. Right+Click anywhere on the main window, except on a channel. A contextual menu will appear...

Select 'New Trigger'. This will give you the option of adding:



- A) String Trigger: Text to be sent out through the Br-Brain4's secondary COM port. You can name each string as you create it. The same string can be selected by name and reused in any other show that uses the same site file. The default 'name' for the trigger is the name you give to the string you are sending.
- B) Audio/Video Trigger: Here's where you now add Audio/Video playback to a show. Just pick the player from the pulldown (Sd-25 w/DMX, **Sd-50/8** or **Sd-50/40** or BrightSign video player), and choose your Audio/Video file. The default 'name' for the trigger is the name of the Audio/Video file, but you can change it if desired. That's really all you need to do!
- C) Comment: Allows you to make notes to yourself that appear as part of the time-line. These are used to display dialog from a show, or just for notes to yourself. The default 'name' for the trigger is the text you enter.



You can have multiple drag-n-drop Audio/Video triggers in each show, and Pc•MACs will keep track of them for you, only downloading the Audio/Video files you have used. Pc•MACs will automatically add an offset to compensate for any triggering delays when it 'draws' in the Audio/Video triggers during the Auto-Download process. If needed, you can adjust this using the 'offset frames' dropdown on the drag-n-drop Audio/Video trigger setup dialog. While you are working in Pc•MACs, you can also choose whether you want to mute audio output from your computer, and if the waveform is displayed on the OffLine Window.

If you want your Audio/Video files to play back from your Audio/Video devices, just do a quick Auto-Download, and drag the resulting folders to the players. Once the files are on the players, Pc•MACs will be able to trigger them too.

Programming Your Show:

At this point you can program the rest of your show. You can reference the [GilderYouTube](#) video tutorials, or the Pc•MACs manual for details on how to get started with show programming.

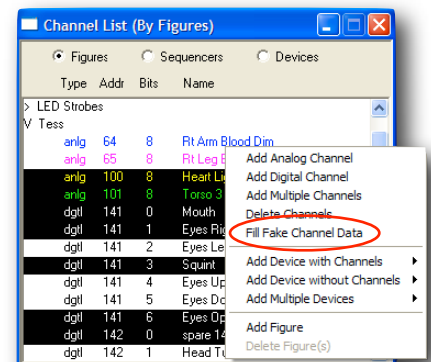
OffLine Editing Window programming can be as simple as:

- 1) Press the 'Selected Channels' button at the bottom middle of the OffLine Editing Window. This opens the 'Move to OffLine' dialog.
- 2) Select all the other Show Control channels you created and move them from the left 'Not Editing' column to the right 'Editing' column.
- 3) Move any the 'Audio Triggers' from the right 'Editing' column to the left 'Not Editing'. You don't want any extraneous data in these channels!
- 4) Click OK to close the 'Move to OffLine' dialog and automatically open the OffLine Editing Window.
- 5) Draw 'lines' all over the Digital channels using the right mouse button. Mush around the analogs using the rubberbanding and other editing commands.

Without a PC•MACs RealTime license, you can program the first 16 channels (128 digitals, 16 analog channels, or a combination of the two) in realtime by connecting your **Sd-50/8** or **Sd-50/40** to your PC using a [C-USB-RS232](#) and [Mp3-50/CBL](#). Just select the serial port from the Preferences/Hardware Setup/Serial Port Options dialog and check ON the 'manual' mode. The Soft Console can be opened from under the Realtime/Show Soft Console command (shortcut = [F5]). You can assign your Analogs and Digitals to the Soft Console, and control and program them using your mouse and keyboard, or using a gaming joystick.

With a [MACs-License](#) and one or more [USB-DMX512 Adapter](#), you can program hundreds or even thousands of channels.

You can also select random channels in the Channels List, and use the 'fake data' command to instantly fill those channels with, as you might expect, fake data. Analogs ramp up and down (triangle waves) and digitals pulse on and off. The period for these are chosen randomly for each output channel. Don't put 'fake' data into the audio trigger channels!



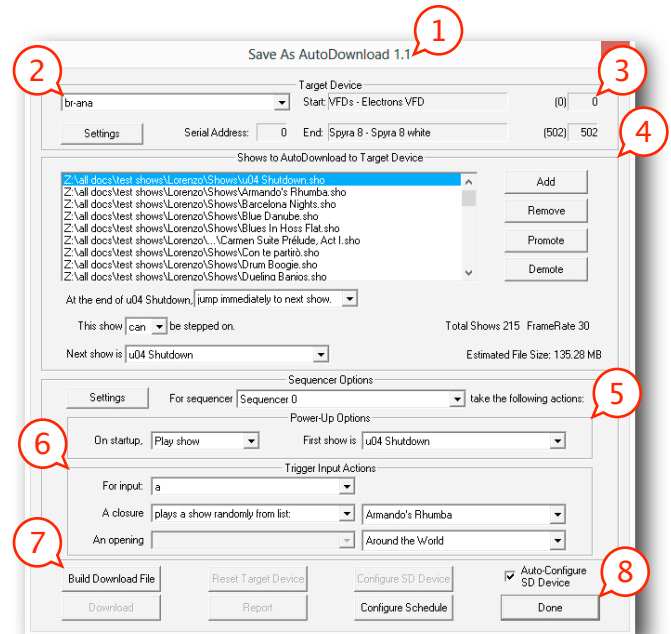
AutoDownloading Shows:

The final step in programming most shows is to generate an AutoDownload file to run on the permanent Show Control System. In this case, this will be your **Sd-50/8** or **Sd-50/40**. An 'AutoDownload Quick Start', as well as full instructions on AutoDownloading shows is found in the PC•MACs manual. Pc•MACs automates most of this process for you.

All you need to do is:

1) Open the 'Save to AutoDownload' dialog:

The 'Save to AutoDownload' dialog is found under the 'File' menu. The AutoDownload dialog has four sections. 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:

Pc•MACs automatically picks the most likely 'Target Device' for your AutoDownload. This will probably be your **Sd-50/8** or **Sd-50/40**. If you want to build the AutoDownload file for another device in your Channels List (if your **Sd-50/8** or **Sd-50/40** are not going to be used as the DMX-512 'master' in your installation), just pick it from the drop-down.

3) Pick the Range of Channels for 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. You can pick the range of channels using either the name if the channel or DMX-512 address for the channel.

4) Pick the 'Shows to AutoDownload to Target Device':

Use this section to choose 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.

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, 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' 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.

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. 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.

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.

The drag-n-drop folder Pc•MACs creates for each **Sd-50/8** or **Sd-50/40** contains:

1. 'SOUNDS' folder for all the SoundFiles used in your shows
2. SD-50.CFG configuration file for the **Sd-50/8** or **Sd-50/40**
3. 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)
4. AutoDownload file for your shows (only for the 'AutoDownload target' **Sd-50/8** or **Sd-50/40**)
5. 'Set' file: A text file with information about the files that are contained in the AutoDownload file (only for the 'AutoDownload target' **Sd-50/8** or **Sd-50/40**)

For Sd-25s w/DMX, Pc•MACs creates a drag-n-drop folder for each Sd-25 in your installation. 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 dipswitches are.

For each BrightSign video players 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 for each player. Within this folder, Pc•MACs will create the '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.

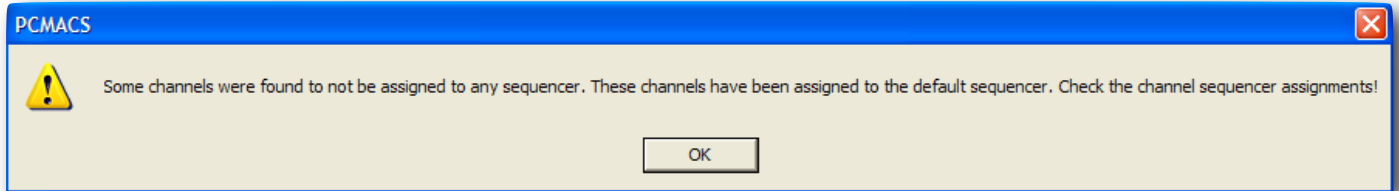
At the end of the AutoDownload process, Pc•MACs will have made a drag-n-drop folder for each Target Device and Audio/Video device that your installation uses. Pc•MACs automatically opens the folder for the AutoDownload 'Target Device', which contains the actual AutoDownload file and 'set' file¹. Just drag-n-drop the content of each of these folders (NOT the entire folder!) onto blank flash cards, and insert them into your players.

¹ The 'Set' file is a simple text file with the listing of the shows and settings which were used in the AutoDownload file.

Updating Older Shows:

If you have older, existing shows that were created with 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 ¹.

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 needed.



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.

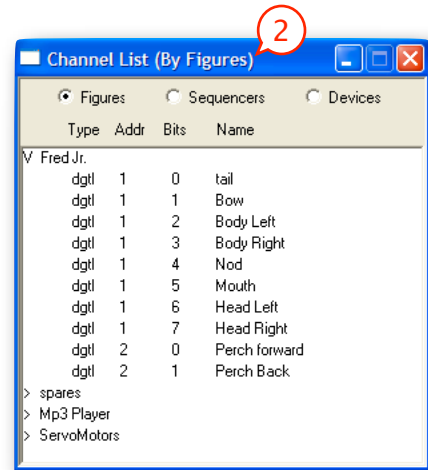
1) Archive Your Existing Shows:

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.

¹ We haven't actually tested this, because old CP/M shows are hard to pull off 8" floppy disks

2) Open the 'Channels List' Dialog:

Typically all of your shows that run on the same **Sd-50/8** or **Sd-50/40** 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].

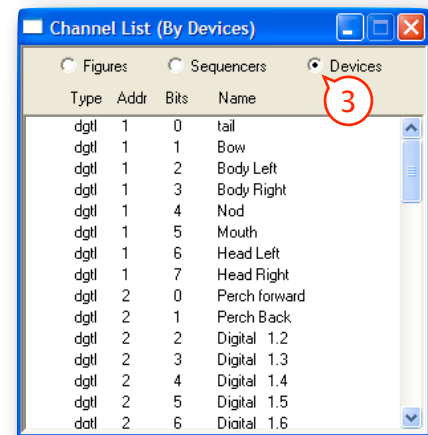


3) View by 'Devices':

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 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.

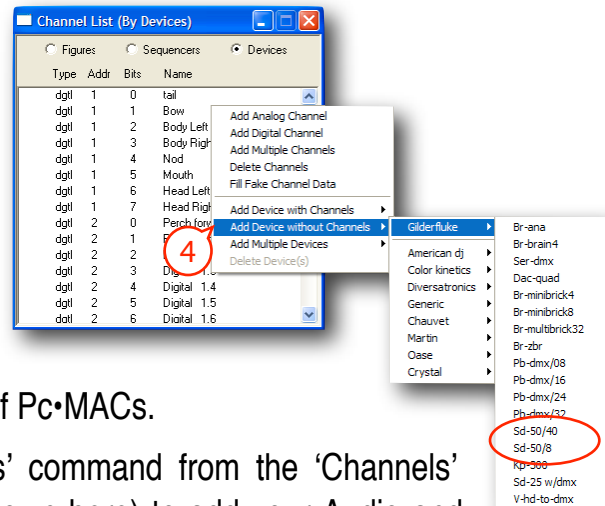
If this show and site file were created with a slightly newer version of Pc•MACs, there may already be some 'device' folders in the list, and you may be able to skip the next step.



4) 'Add Devices Without Channels':

*If your **Sd-50/8** or **Sd-50/40** are already listed in the Channels List, 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 requires, you need 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 just for upgrading existing shows that were created using older versions of Pc•MACs.



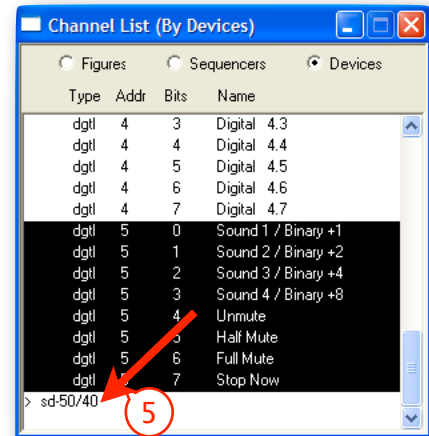
Use the 'Add Devices Without Channels' command from the 'Channels' menu or (Right+Click) contextual menu (as shown here) to add your Audio and Video devices (Sd-25s w/DMX, **Sd-50/8** or **Sd-50/40**, v-Hd-to-DMX or v-Hd-to ¼J6).

5) Move Existing Audio/Video 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 DMX-512).

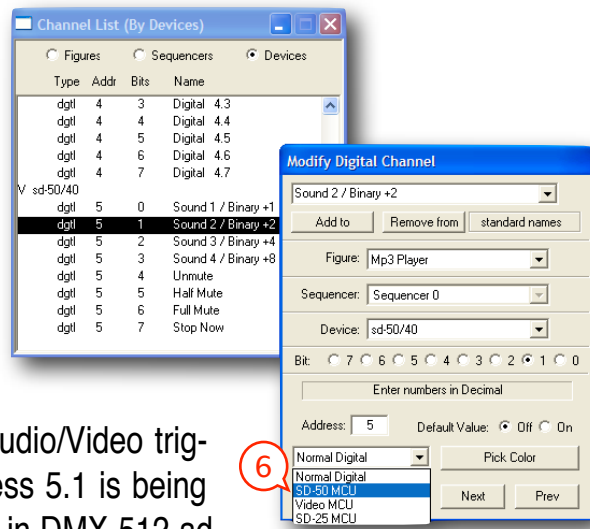
For an **Sd-50/40**, the DMX-512 address for the Audio/Video trigger channels will typically be on DMX-512 address 5 (zero-based DMX-512) or 6 (one-based DMX-512).

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.

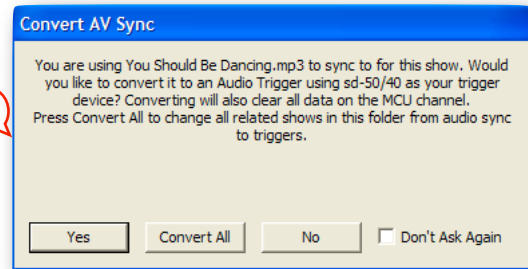
In the lower left corner of the dialog, there is a new drop-down. These are probably going to be set to 'normal digital'. You need to pop it open and switch it to a 'MCU' for the appropriate Audio/Video device. Doing this to just one bit will switch all eight bits that share the same DMX-512 address. 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.

7) Save and 'Convert Audio/Video Sync':

Save your show and then reopen the same show. Opening the #1 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 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', so that Pc•MACs will update all the shows in the folder 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.

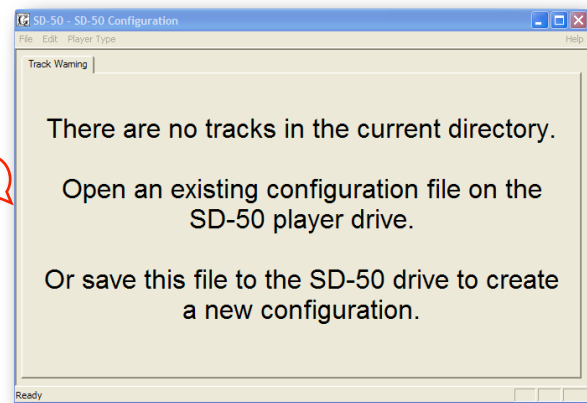
When you open the shows that have been updated to the new drag-n-drop Audio/Video triggers, you will find that the Audio/Video 'sync' on the 'Show Information' dialog will have been changed to 'internal', and there are new Drag-n-drop triggers on the OffLine Editing Window. These drag-n-drop Audio/Video 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.

Getting Started with an Sd-50/0 (quickly)

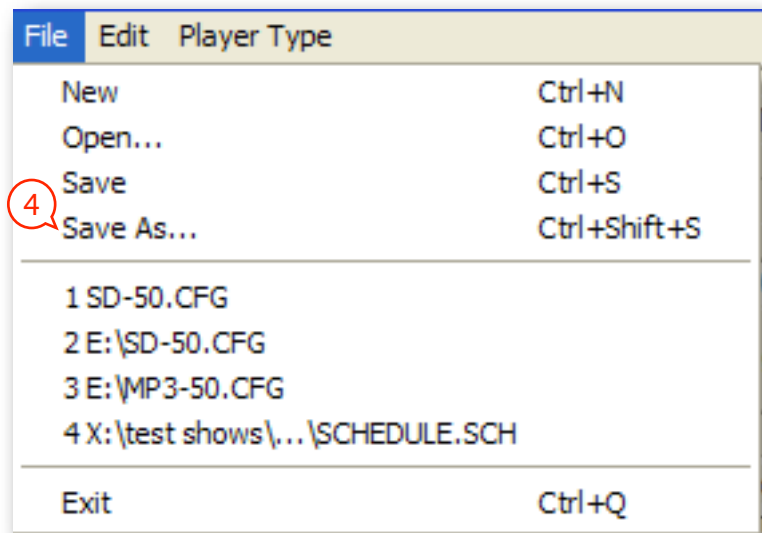
If you are using an **Sd-50/0**, it is typically running as a stand-alone audio player, rather than a part of an overall Show Control System. For this reason, it is normally configured manually, rather than as part of a Pc•MACs show.

The '**SdConfig.exe**' program's [default settings](#) can be used in most **Sd-50/0** applications.

- 1) Make a new Drag-n-Drop folder on your desktop, or you can use the Sd card directly. If using a Sd flash card directly, Check that the card is formatted for 'FAT32'. Reformat if needed. ([What to do with a new Sd Flash card](#))
- 2) Drag and drop all the .mp3/.wav audio files you want to use on your **Sd-50/xx** over to the empty Sd flash card or empty drag-n-drop folder.
- 3) Open the '**SdConfig.exe**' program. The '**SdConfig.exe**' program will want to know where your .mp3/.wav files are located. It will probably display the following screen because it can't find your SoundFiles ([No files in Directory Warning](#)):

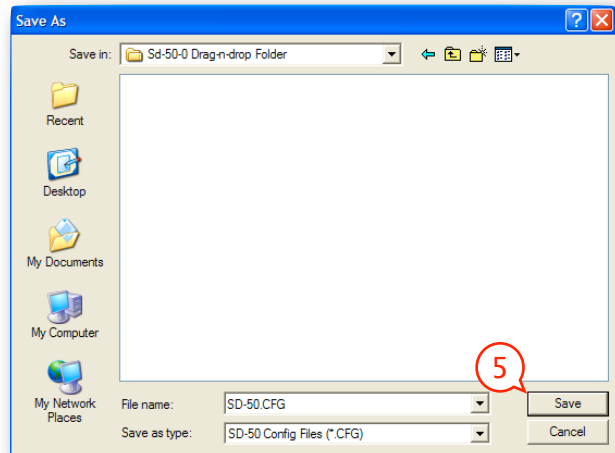


- 4) Do a 'Save As...' from under the 'File' menu:



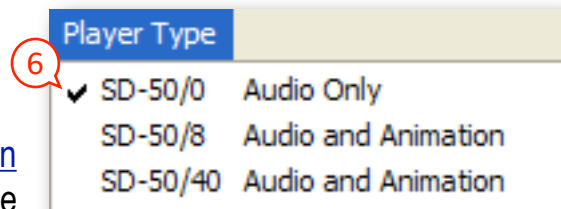
- 5) Don't change the default 'SD-50.cfg' name for the file. Just point Windows at your Sd flash card or drag-n-drop folder, and click 'Save'.

The instant you press 'save', the 'SdConfig.exe' program will organize all of your SoundFiles into a 'SOUNDS' folder, and put a copy of itself and the blank Sd-50.CFG file into the Sd flash card or drag-n-drop folder.



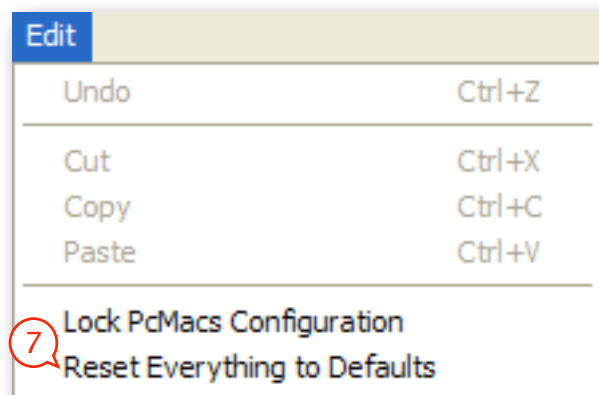
- 6) Select the 'Player Type'. In this case, we are using an **Sd-50/0**...

Now that the 'SdConfig.exe' program knows what type of player it is configuring, the 'No files in Directory Warning' message will disappear and the other menu tabs will be shown.



- 7) From under the 'Edit' menu, select 'Reset Everything to Defaults'.

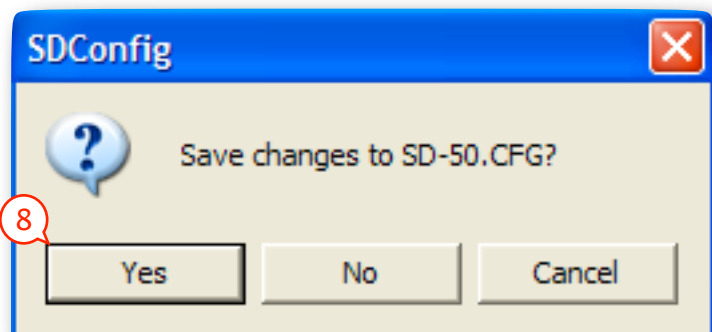
You can manually configure your **Sd-50/xx** player, but for the majority of users the defaults will suffice.



- 8) 'Exit' and 'Save' (or 'Save' and 'Exit')

Make sure you answer 'Yes' if it asks you if you want to save your changes....

- 9) *Skip this step if you are already working directly on an Sd Flash card*



Insert the Sd flash card into you computer, or a USB card adapter. Currently, this card must be 2 GBytes or smaller (An Sd card, and NOT an SdHC card). Check that the card is formatted for 'FAT32'. Reformat if needed. ([What to do with a new Sd Flash card](#)).

10) *Skip this step if you are already working directly on an Sd Flash card*

Drag-n-Drop the contents of your **Sd-50/0**'s drag-n-drop folder to the Sd flash card. DO NOT drag the entire drag-n-drop folder. You need to open it and just move its contents!

11) Tell Windows to 'Eject' the Sd flash card and Move the Sd flash card to the **Sd-50/0**. If you do not 'Eject' the Sd flash card properly, Windows may damage the files it still copying them to the Sd flash card.

If you just configured an **Sd-50/0**, it is now ready to run. Connect speakers and a power supply. If you set a startup sound, It will start playing as soon as it is powered up. Otherwise, it will now accept inputs on the '[¼ J6](#)' inputs to trigger and play sounds. Depending on the number of SoundFiles, the '**SdConfig.exe**' program will have set the inputs to directly select the SoundFiles (one to eight SoundFiles), or use a binary pattern to select them (nine or more SoundFiles).

Depending on the number of SoundFiles you have on the **Sd-50/0**, some of the upper input bits may have been set to stop, mute, unmute, or half mute the audio ([Default Settings](#)).

Sd-50/0, Sd-50/8 or Sd-50/40 Overview

The **Sd-50/xx** family consists of three members:

The **Sd-50/0** is a complete .Mp3/.wav player system. It uses a standard Sd flash card to hold audio files stored in .mp3 or .wav formats. It includes an amazingly efficient 100 Watt Class-D stereo amplifier which has the output power of many 500 Watt linear amplifiers. With no moving parts to wear out, the **Sd-50/0** should well outlast the speakers it is attached to. The **Sd-50/0** can be used singly, or in combination with additional **Sd-50/xx's**, **BR-SmartMedia** cards or any Gilderfluke & Co. equipment. It can provide the audio for animated shows and displays, fountains, fireworks, safety announcements, advertising, alarm systems, window displays special effects, signs, clocks and carillons, or anything else that needs a sound to be played back.

Audio is loaded onto the **Sd-50/0s** by first converting it to an .mp3 or .wav format files. There are a number of commercial, freeware and shareware programs for doing this. All audio editing programs now include .mp3 encoders¹. You can even use Apple's iTunes!

SoundFiles are moved to the **Sd-50's** by temporarily moving the Sd flash card to an appropriate slot or reader attached to your computer. The **Sd flash card** will appear as a 'removable disk drive' on your computer. You can then 'drag and drop' your audio and show files onto to the Sd flash card. This works identically when using either a Macintosh or Windows-based computer.

The **Sd-50/8** and **Sd-50/40** add Show Control features to the **Sd-50/0s**. The **Sd-50/8s** or **Sd-50/40s** can be used singly, or in combination with additional **Sd-50/xx's**, **BR-SmartMedia** cards or any Gilderfluke & Co. equipment. 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, neon special effects, signs, machines and machine tools in process control, or anything else that can be controlled by an electrical signal.

The Show Control side of the **Sd-50/8** or **Sd-50/40** is programmed using our **PC•MACs** Show Control software. While programming, data can be sent to the **Sd-50/8** or **Sd-50/40** through its [DMX-512](#) input, ['Net Serial' RS-422 port](#), or [RS-232 serial port](#). Once programed, data is sent to the **Sd-50/8** or **Sd-50/40** through the PC's serial port or loaded onto the Sd flash card for permanent storage. The **Sd-50/8** or **Sd-50/40** can then be disconnected from the PC and it will run all by itself.

When used with a 'Hardwareless RealTime' licensed copy of **PC•MACs** software, **Sd-50/8s** or **Sd-50/40s** can have their outputs programmed and updated in real time with just a PC and a serial connection. When used with the **PC•MACs** hardware ([MACs-License](#) and [USB-DMX512 Adapter](#)), up to sixty-four **Sd-50/8s** or **Sd-50/40s** can be updated in RealTime through each DMX-512 port.

Features of the Sd-50/0 include:

- Stand alone stereo playback of standard .mp3 and .wav audio files. The Sd-50s support all standard .mp3 encoding rates, including 'variable'. Sixteen bit .wav files with sample rates up

¹ Contact our sales staff for current .mp3/.wav file converter recommendations.

to 48K per second are supported.

- Amazingly powerful 100 Watt Stereo Class-D Amplifier (fifty watts/channel). This amplifier has the output power of a typical 400 to 500 Watt linear amplifier, but without the high current draw and waste heat. In most applications, this amplifier means that all you need to add are appropriate speakers, an Sd flash card and a power supply to get up and running.
- Up to 255 different SoundFiles can be selected and played.
- Sound capacity is only limited by the size of the Sd flash card installed. As of this writing, Sd cards of up to two GBytes have been tested with the **Sd-50/xx's**. Using typical .mp3 data rates, you can put about two full day's worth of sound (yes, 48 hours!) on a single four GByte Sd card. Larger capacity Sd cards are on the way, and should work just as well, and hold even more sound.
- Audio data is stored in standard [Sd flash cards](#). You move the Sd flash card to your computer for high speed 'drag-n-drop' downloading. Some computers have Sd slots built in. Others will need to use a USB-to-Sd adapter. In either case, your Macintosh or Windows-based computer will mount the Sd flash card as a 'removable Drive'. You copy your sound and animation files to the Sd flash card by just drag-n-dropping it, just as you would copy any file from one folder to another.
- Two line level outputs (RCA Jacks) for attaching external amplifiers.
- All configuration is done through a user friendly Windows-based '[SdConfig.exe](#)' program. You can set the volume, EQ, and what each of the trigger inputs does. Eight of the [inputs](#) are from the outside world through optoisolators, The other eight [inputs](#) come directly from the Show Control side of the **Sd-50/8** or **Sd-50/40**, if these options are installed. Any of the inputs can be used to ramp audio to preset levels, select and play specific SoundFiles or select SoundFiles from a preset list or randomizer. Shows can be selected directly by an input, or using a binary pattern to allow access to all 255 different possible audio files.
- Screwdriver-accessible [volume controls](#). These make it easy to make final adjustments in the output level of the Sd-50s. Additional '[software](#)' [volume](#) controls set up through the '[SdConfig.exe](#)' program allow you to set 'limits', so the volume can not be turned too high using these pots.
- [Mounts](#) stand alone, in 2-3/4" Augat Snap Track, or up to ten in an [Sd-50/CC10 cage](#) (**Sd-50/0** only). Using optional brackets, mounts on most flavors of DIN rails.
- The Sd-50/xx will run from [power supplies](#) with output voltages between twelve to twenty-four volts DC. The **Sd-50/xx's** can even be run from batteries! For maximum output with the onboard amplifier, use twenty-four volts, and add approximately 100 Watts (for amplifier) plus your loads when selecting your power supply. Both screw terminal and 2.1 mm power connections are available.

Features the Sd-50/8 and Sd-50/40 adds includes...

- Eight (**Sd-50/8**) or forty (**Sd-50/40**) digital (on/off) [Show Control outputs](#) to an **Sd-50/0**. These can be used to drive solenoid valves, relays, LEDs and other typical loads directly.
- [DMX-512 input](#) for programming or controlling the .Mp3/.wav player and show control outputs. The **Sd-50/8** or **Sd-50/40** can be operated as a 'slave' following whatever DMX-512 data it receives from the DMX-512 network.
- [DMX-512 output](#) from onboard Show Control memory or when running from RealTime updates through the RS-232 serial port. The **Sd-50/8** or **Sd-50/40** can be operated as a 'master', sending DMX-512 to control other **Sd-50/8s** or **Sd-50/40s**, light dimmers, wiggle lights, strobe lights, or any other DMX-512 controlled devices. The DMX-512 output is also an easy way to add additional Show Control outputs to **Sd-50/8s** or **Sd-50/40s**.
- Up to eight of the '¼ J6' Show Control outputs can be used to control model airplane-style [PWM ServoMotor outputs](#).
- Automatic 'program in place' download through the serial port on your PC or through the Sd flash card. The amount of time it takes to download shows the **Sd-50/8** or **Sd-50/40** depends on the length of the show(s) and the number of channels used. Short shows take only seconds. Shows that fill the entire **Sd-50/8s** or **Sd-50/40s** memory will take longer to download. It is much quicker to move the completed shows to the Sd flash card, and let the **Sd-50/8s** or **Sd-50/40s** load them from there. Show audio and animation data can be distributed to clients by sending out preloaded Sd flash cards.
- Four MBytes of nonvolatile [Show Control memory](#). Using all forty **Sd-50/40** Show Control outputs (and the audio control channel), this gives a show capacity of about six hour at thirty updates per second! About eighteen hours for the **Sd-50/8** using all eight of its outputs (and the audio control channel)! Once downloaded, show data is retained for approximately forty years, with or without power applied. Up to 255 individual shows can be loaded onto an **Sd-50/8** or **Sd-50/40** at one time.
- [Battery-backed](#) Real Time Clock. The Clock is factory trimmed for an accuracy of 50 parts per million (PPM). Using the [365 day schedule](#), you can set when shows and sounds will be played up to a year in advance. You can set it to play a specific schedule on a specific day, or you can select a schedule by the day of the week. As an example, you can set a special schedule to be used on the Fourth of July each year, or set a different schedule to be used only on Sundays only through an entire month. In school and factory bell systems, different schedules can be used on weekdays, and different schedules (or no schedule at all) for the weekends. As long as the rules for the Gregorian calendar and leap years don't change, the Real Time Clock will be accurate until the year 10,000. The centuries will not automatically advance, and will need to be adjusted manually each 100 years.
- Optional [GPS](#) can be used to continuously synchronize the clock inside the **Sd-50/8** or **Sd-50/40** to the world time standards broadcast from the GPS satellites orbiting over the earth. This keeps the **Sd-50/8** or **Sd-50/40** synchronized to UTC (also known as 'Zulu' or 'Greenwich

Mean Time' ('GMT')) to within .001 of a second. Multiple **Sd-50/8s** and **Sd-50/40s** located anywhere on Earth can be scheduled to play the same shows and sounds at the same times, and will play them with .001 second accuracy. A more down-to-earth application would be to synchronize the sounds and animation on a series of parade floats so that they all play with perfect synchronization. The GPS receivers will work anywhere a clear view of the sky is available. They are sealed to IP67 standards for mounting outdoors or in wet locations, and come with a 25 foot cord to allow them to be mounted where they can receive the best GPS signals.

- AudioFiles can be selected, played and audio levels [controlled from the Show Control System](#). Digital controls can be used to [ramp levels](#) between full, half and completely muted. The [rate of fades](#) can be set up to 9.9 seconds. Left and Right audio outputs can also be [assigned](#) to one or two analog channels, and the volume can be controlled individually, or assigned to the same analog control channel and controlled together.
- Two hundred fifty-five shows can be loaded onto an **Sd-50/8** or **Sd-50/40** at one time. Shows can be accessed sequentially or directly using the four optoisolated '[J8](#)' [inputs](#) or serial commands sent through the [RS-422 serial port](#). The 'Next' show can be set for the end of any show, allowing you to loop a single show or build 'chains' of shows.
- The **Sd-50/8** or **Sd-50/40** 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. This allows you to program 'delay' shows that tick along at a low frame rate between your main shows, and use very little memory.
- Four optoisolated '[J8](#)' [inputs](#) to synchronize **Sd-50/8s** or **Sd-50/40s** with pushbuttons or other real-time events. Multiple **Sd-50/8s** or **Sd-50/40s** can be triggered simultaneously or sequentially. Each **Sd-50/8** or **Sd-50/40** input can be set to start, stop, pause, continue, or directly select and play a specific show. Different actions can be requested on each inputs' opening or closing edges. If not used for anything else, the four optically isolated inputs can be used to select and play up to fifteen shows at random through using a binary weighted pattern.
- Shows can also be triggered via the [RS-232](#) or [RS-422](#) serial ports, [MIDI in](#) 'notes', or [IR Trigger Mode](#).
- Each of the eight (**Sd-50/8**) or forty (**Sd-50/40**) [Show Control outputs](#) is rated for a continuous load of 150 ma., or 500 ma. peak. This is enough to drive small solenoid valves, relays, LEDs and similar loads. Relays can be used to control higher current or voltage loads (**DRV-03**, **Pb-DMX/08** through **Pb-DMX/32**, **Pb-08** through **Pb-32**, **LC-8SP**, or **SSR-FS**). If more than forty outputs are needed, additional **Sd-50/8s** or **Sd-50/40s** can be added to give you as many outputs as you need.
- The digital [Show Control outputs](#) from an **Sd-50/8** or **Sd-50/40** can be fed to Digital to Analog converters (like our single channel **DAC-08** or four channel **DAC-QUAD**) wherever you need 0-10 volt analog control signals.
- When programming, or when installed as a permanent part of a larger control system, the **Sd-**

50/8 or **Sd-50/40** accepts data through its [DMX-512](#) and [RS-422](#) serial port. This data is used to update the outputs, and takes precedence over the on board Flash memory.

Differences between Sd-50s and Mp3-50s

Many first-time users of the **Sd-50/xx** will be familiar with our **Mp3-50/0**, **Mp3-50/8** or **Mp3-50/40**. The **Mp3-50/xx** series of Audio Repeaters and Show Controllers are the direct ancestors of the **Sd-50/xx** series. At first glance, it may be hard to tell the two of them apart. Their cases, mounting holes, and connectors are almost identical.

Some of the differences are:

- The **Mp3-50s** used SmartMedia Flash cards for audio storage, which were the most common type of flash card available at the time the **Mp3-50s** were released. The **Sd-50/xx** series use Sd flash cards. Sd flash cards are now the most common type of flash card available. SmartMedia Flash cards topped out with capacities of 128 MBytes. Sd flash cards are widely available with capacities well into the GByte range.
- The **Mp3-50** series required 'blessing' the flash card to load the firmware the player needed to run before it could be used. No 'blessing' is needed with the **Sd-50/xx** series.
- The **Mp3-50** series required drivers be loaded on your computer before it would work with them. The **Sd-50s** need no special drivers on your computer.
- The **Mp3-50** series featured a USB port to download sounds and configurations to the SmartMedia card. This was also the only way to 'bless' a flash card before use. The **Sd-50s** eliminate the USB port and 'blessing' altogether. Cards are loaded with sounds and configured by moving them to a computer with a suitable Sd slot or adapter.
- The **Mp3-50** series limited the number of DMX-512 output channels to sixteen. No such limitation exists on the **Sd-50s**.
- DMX-512 is output on the **Sd-50s**, no matter what mode is selected for the DMX-512/MIDI serial input. On the **Mp3-50s**, the output port always followed what was set on the input port.
- The **Mp3-50s** could not use the '[¼ J6](#)' port for triggering animation. The **Sd-50s** can. You can select shows directly using these eight inputs, or use a binary pattern to directly select any of 255 different shows.
- The **Sd-50/8** or **Sd-50/40** will allow you to take over pins used on the '[¼ J6](#)' port for controlling up to eight model airplane-style PWM ServoMotors.
- The amplifier used on the **Sd-50/xx** series is rated for 100 Watts of class-D power, which is equivalent to many 500 Watt linear amplifiers. The amplifier on the **Mp3-50s** was rated for 22 Watts stereo, or 11 watts per side.
- The inputs and outputs on the **Sd-50/xx** series are better protected against transients.
- Onboard flash memory is eight times larger on the **Sd-50/xx** series than the **Mp3-50** series.
- The RTC was installed on **Mp3-50s** only with the 'Atomic' Clock option. The **Sd-50/8** or **Sd-50/40** come with the Real Time Clock chip installed, so the 365 day scheduling of sounds

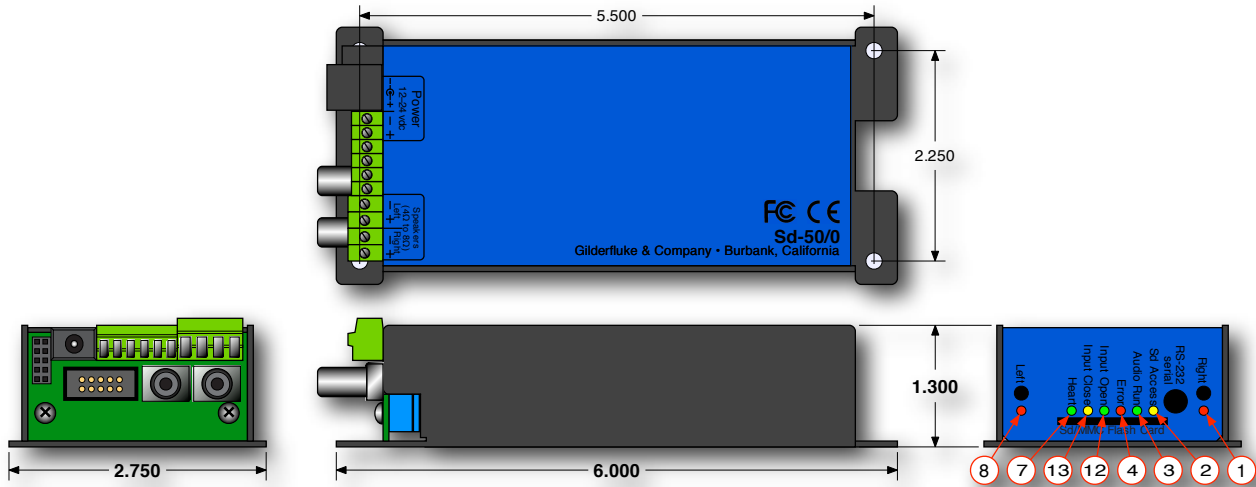
and shows can be used, albeit with less accuracy than is available with either the GPS or 'Atomic' clock options.

- Schedules can now be 'named', and the names are retained for display on the [serial menus](#) and for further editing.
- Firmware upgrades only need the appropriate file be loaded onto an Sd flash card. On the next boot, the player will check to see whether the firmware is more up-to-date than it already has, and load it if it is.
- Show, schedule and GPS files are loaded at boot-up only if they are different (different name, date or time) from the files that are already loaded into the **Sd-50**. This means that there is only a delay on boot-up if you have changed to a different flash card with a different show, schedule or GPS files on it.
- Real time updates on [serial port menus](#). Shows sounds and shows playing, input status, schedules being used, and names of the shows and sounds that are started from the RTC schedules.

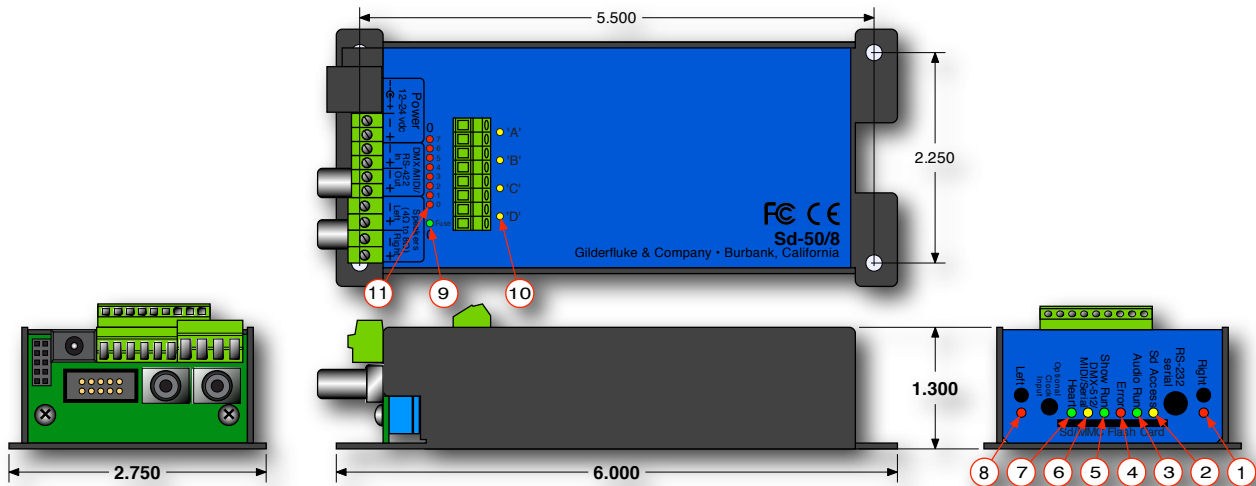
Sd-50/0 Sd-50/8 or Sd-50/40 Indicators

There are only a small number of [connections](#), indicators, and [configuration switches](#) on each Sd-50/0, Sd-50/8, Sd-50/40.

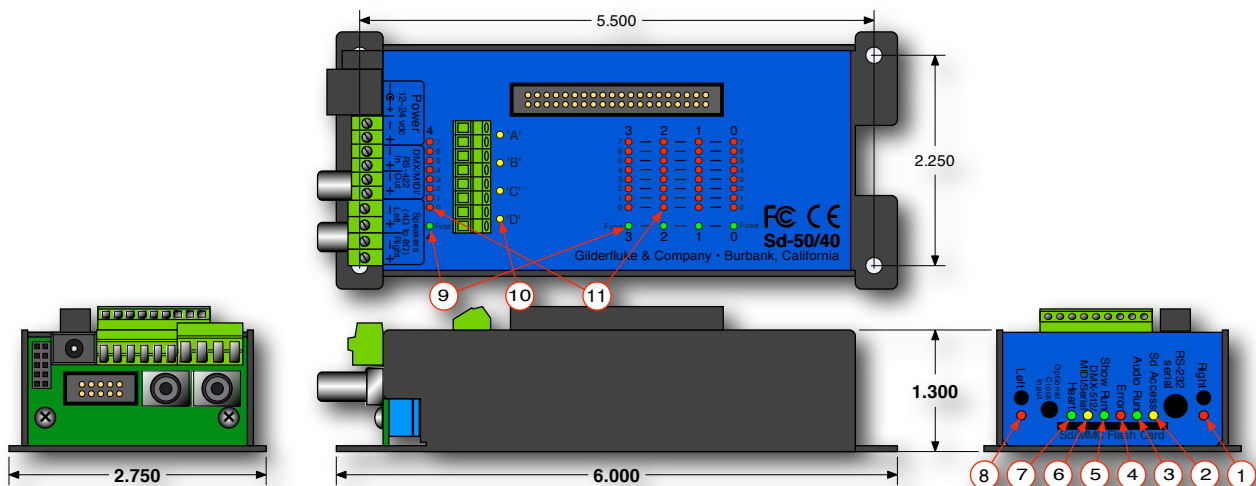
Sd-50/0 (Audio Only):



Sd-50/8 (Audio & Eight Show Control Outputs):



Sd-50/40 (Audio & Forty Show Control Outputs):



There are up to fifty-seven Status LEDs on the Sd-50/xx:

1) Right (Sd-50/0, Sd-50/8, Sd-50/40)

This LED flickers to give you a rough approximation of the audio being played out of the right side of the audio player. It is downstream of the volume processing done on the **Sd-50/0**, and will dim to reflect changes in [volume level](#). It is upstream of the Right Volume Control Pot. Changes in the Right [Volume Control Pot](#) will not affect the output level of this LED.

2) Sd Access (Sd-50/0, Sd-50/8, Sd-50/40)

This LED glows to show accesses to the Sd-card. Even when idle, this led will be flickering slightly as the audio processor makes sure its friend, the Sd card hasn't left it stranded.

3) Audio Run (Sd-50/0, Sd-50/8, Sd-50/40)

This LED will light to show that the Audio Player is currently playing back an .mp3 or .wav audio file.

4) Board Error (Sd-50/0, Sd-50/8, Sd-50/40)

This LED will flash to show you that the **Sd-50/8** or **Sd-50/40** has sensed one of the following errors:

- a) **RealTime DMX-512 Update Error:** The optional checksum in the DMX-512 RealTime update didn't agree with the data received.
- b) **RealTime Serial Update Error:** The checksum in the serial RealTime update didn't agree with the data received.
- c) **Download Error:** There was an error in the data being downloaded to the **Sd-50/8** or **Sd-50/40**.
- d) **Download Timeout:** If the data being downloaded to the **Sd-50/8** or **Sd-50/40** stops midstream, this LED will flash as the **Sd-50/8** or **Sd-50/40** returns itself to normal operating mode.
- e) **Data Verification Failure:** If you ask the **Sd-50/8** or **Sd-50/40** to verify the data in its flash memory, and it finds an error, it will flash this LED as well as displaying an error message on your computer screen.
- f) **Memory locked:** If you try to clear the flash memory or send a show to the **Sd-50/8** or **Sd-50/40** while the Write Protect is in the 'locked' position.

5) Show Run (Sd-50/8, Sd-50/40)

This LED will light to show that the Show Control half of the **Sd-50/8** or **Sd-50/40** is currently running a preprogrammed show. This LED will also flash at half of the frame rate (usually 15 Hz) when the **Sd-50/8** or **Sd-50/40** is receiving RealTime update data either through the DMX-512 or serial ports. During flash memory downloads, this LED will alternate on each 256 bytes of data received. At the normal 9600 baud serial rate, this is about one Hz. This LED flashes at about the same rate when loading files from the Sd, even though the data is being loaded much more quickly.

6) DMX/MIDI/Serial (Sd-50/8, Sd-50/40)

This LED will light to show that the **Sd-50/8** or **Sd-50/40** is receiving RealTime Update data through the [DMX-512](#), [MIDI](#), [RS-232](#) or [RS-422](#) serial ports. If the **Sd-50/8** or **Sd-50/40** is receiving show starts from MIDI input, then this led will flash for about 1/10th of a second each time a 'start' happens. During flash memory downloads, this LED will flash alternately with the Show Control Heart LED at twice the normal heartbeat rate.

7) Heart (Sd-50/0, Sd-50/8, Sd-50/40)

The 'heartbeat' will always flash so that you can see that the **Sd-50/xx** is alive. If this LED doesn't flash at least twice per second, you should power down the **Sd-50/xx** and check the power supply and connections to the **Sd-50/xx**. During flash memory downloads, this LED will flash alternately with the DMX/MIDI/Serial LED at twice the normal heartbeat rate. During firmware upgrades, these two really go pitter-pat.

8) Left (Sd-50/0, Sd-50/8, Sd-50/40)

This LED flickers to give you a rough approximation of the audio being played out of the left side of the audio player. It is downstream of the volume processing done on the **Sd-50/0**, and will dim to reflect changes in [volume level](#). It is upstream of the Left [Volume Control Pot](#). Changes in the Left Volume Control Pot will not affect the output level of this LED.

9) Fuses (1 LED on Sd-50/8, 5 LEDs on Sd-50/40)

The eight inputs of an **Sd-50/0** and the eight outputs of the **Sd-50/8** or **Sd-50/40** make one, eight-bit wide 'channel'. The forty outputs of the **Sd-50/8** or **Sd-50/40** are divided into five, eight-bit wide 'channels'.

The eight inputs of an **Sd-50/0**, eight outputs of an **Sd-50/8**, and last channel of an **Sd-50/40** are shared with the eight optically isolated inputs to the audio half of the **Sd-50/8** or **Sd-50/40**. This channel, and only this channel can be switched between using 'internal' and 'external' power using the switch on the bottom of the unit. This will be lit when there is an external voltage source present between pins #1 and #10 of the '[¼ J6](#)' input, when the switch is in the 'external' position. If the fuse LED is off for this channel, check to confirm that this switch is not in the 'external' position if you are not feeding this channel an external voltage source.

Each channel is fused for approximately one Amp of continuous current. These LEDs light to show if the fuses are OK. If any are out, then a short circuit (or too heavy of a load) is dragging the outputs down and causing the fuse to open. The fuses are actually 'Polyswitch fuses', which act more like circuit breakers. Once the overload is removed, they reset.

10) J8 'A', 'B', 'C', & 'D' Input LEDs (Sd-50/8, Sd-50/40)

These four LED will light to show current is flowing through the four '[J8](#)' Show Control Trigger inputs. These LEDs are on the output side of the optoisolators, so if they are glowing, the microcontroller in the unit should be seeing the signal. These four trigger inputs are the only way to use a switch closure input to start the animated sequence playing on an **Sd-50/8** or **Sd-50/40**. If not using the GPS, these LEDs will flash slightly as the clock chip in the **Sd-50/8** or **Sd-50/40** is read.

11) Output LEDs (8 LEDs on Sd-50/8, 40 LEDs on Sd-50/40)

These LEDs show the current status of the [Show Control digital outputs](#). If a LED is lit, then that output is 'ON'. Because the outputs of an **Sd-50/8** or **Sd-50/40** are 'Open Collector, Switch To Ground', you can ground out any output pin, and the appropriate LED will light. This can be useful when diagnosing output wiring problems. If you are commanding 'on' an output and you don't see a LED, then the output is probably drawing too much current and the output is 'self protecting'. Disconnect the load and see whether the LED now lights. If it does, then it definitely is an overload problem. If it does not, then try turning 'on' some of the other outputs. If they light OK, then the output driver might be damaged. If they do not, then verify your addressing and retest.

If any of the pins on the '[¼ J6](#)' output from an **Sd-50/8** or **Sd-50/40** are being used a [ServoMotor PWM outputs](#), the corresponding output LEDs will have a steady glow.

A **Sd-50/0** has eight optically isolated trigger inputs which can be used to select, start shows and SoundFiles and change the audio levels of the audio half of the **Sd-50/0** player. The only output channel on an **Sd-50/8**, and the last output channel on an **Sd-50/40** are shared with these audio trigger inputs. Normally these are not used to trigger the audio on an **Sd-50/8** or **Sd-50/40**. The [Animation 'Virtual' MCU Trigger](#) inputs from the Show Control half of the **Sd-50/8** or **Sd-50/40** are normally used instead. This leaves these eight outputs free to be used as outputs on most **Sd-50/8** and **Sd-50/40** applications.

12) Input Open (Sd-50/0)

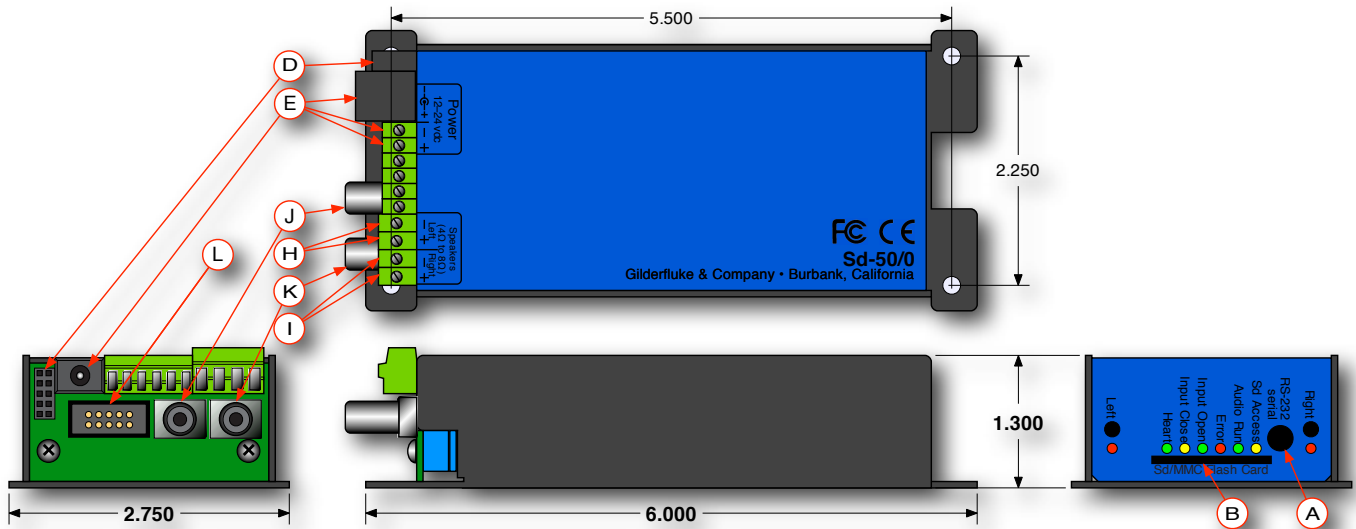
This LED flashes briefly to show that an opening edge has occurred on any of the eight '[¼ J6](#)' inputs.

13) Input Close (Sd-50/0)

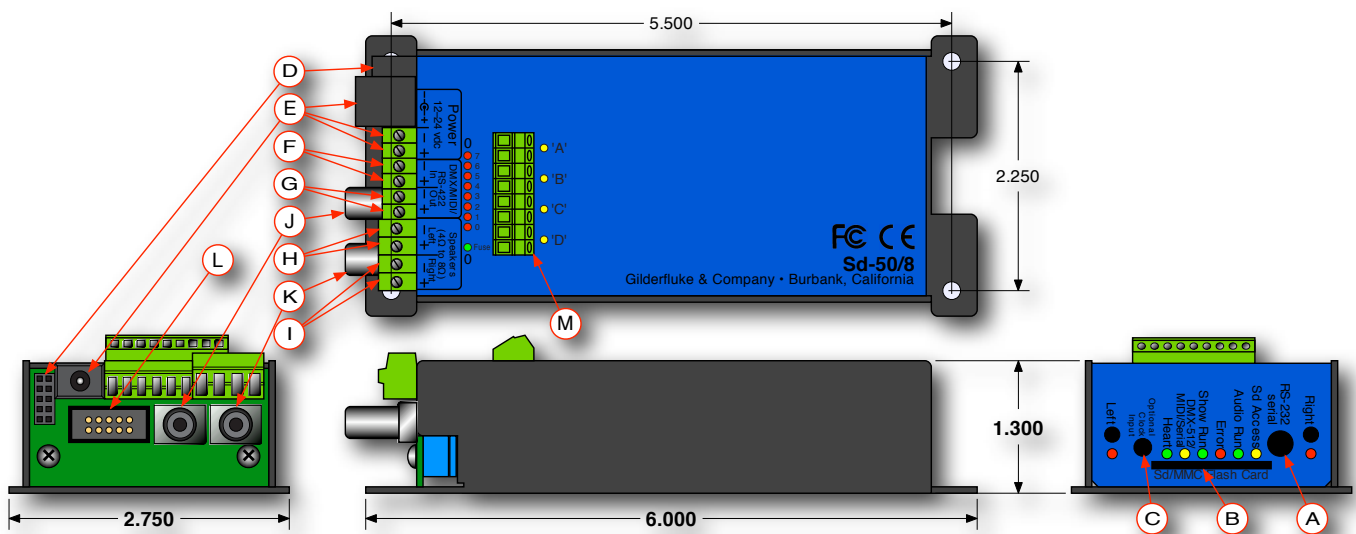
This LED flashes briefly to show that a closing edge has occurred on any of the eight '[¼ J6](#)' inputs.

Sd-50/0, Sd-50/8 or Sd-50/40 Connections

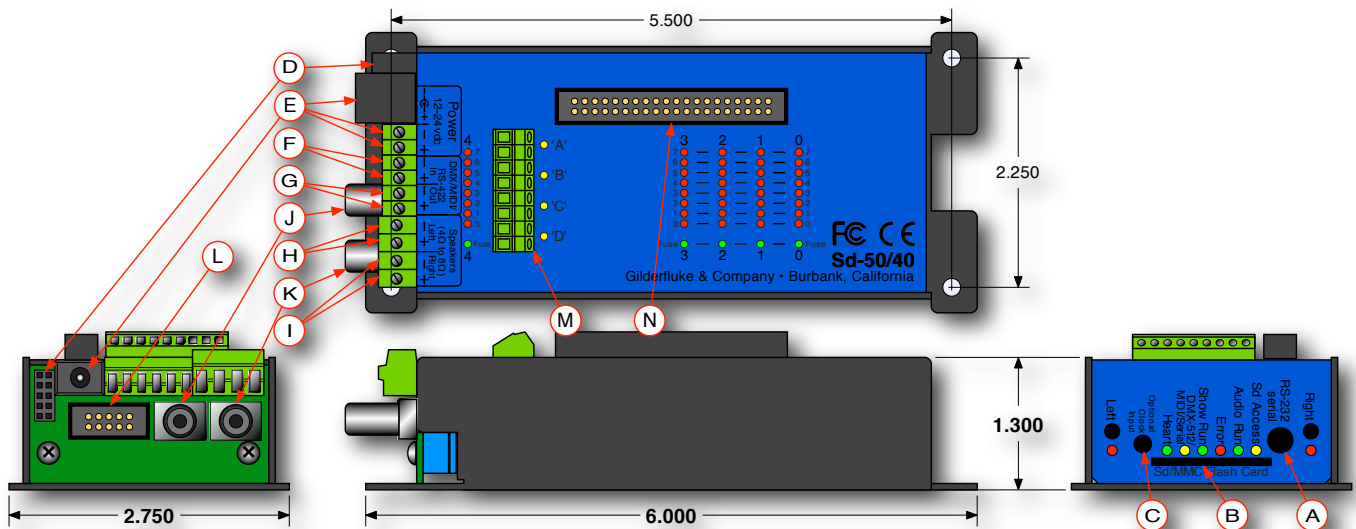
Sd-50/0 (Audio Only):



Sd-50/8 (Audio & Eight Show Control Outputs):



Sd-50/40 (Audio & Forty Show Control Outputs):



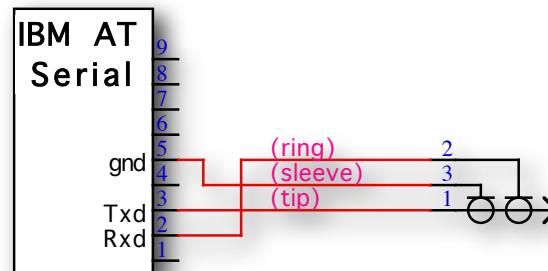
A) RS-232 Serial Port (Sd-50/0, Sd-50/8, Sd-50/40)

The serial command set is identical to, and compatible with all the RS-422 Serial Ports used on Gilderfluke & Company products. One difference between the **Sd-50/xx** and most of our products is that the serial port is the primary method used to configure it. an **Sd-50/xx** is normally configured through the '**SdConfig.exe**' program. This configuration is downloaded to the **Sd-50/xx** each time the **Sd-50/xx** is turned on, but only if there is a difference between what was already on it.

The **Sd-50/xx** has a [serial 'configuration' mode](#) which will allow you to check and modify the status and configuration of the Show Control half of the **Sd-50/xx**. This is used to configure the animation half of an **Sd-50/xx** if the audio half is not yet, or never is going to be used.

If an Sd flash card is inserted into the **Sd-50/xx** which has been configured using the '**SdConfig.exe**' program, any changes you have made to the configuration through the serial port will be overridden by what is on the Sd flash card.

The serial data signals from the **Sd-50/xx**'s are brought out on a 1/8" three conductor 'stereo' socket. Its pin out and cross connect to the standard serial port on a PC is as follows:



The mnemonic for remembering the connections are: Ring = Receive, and Tip = Transmit.

The **Sd-50/xx** expects to see the serial data in the following format:

**ONE START BIT
EIGHT DATA BITS
ONE STOP BIT**

B) Sd Socket (Sd-50/0, Sd-50/8, Sd-50/40)

This is where you plug in the flash card that is used to store the sound that is played back by the **Sd-50/xx**.

MMC (short for MultiMedia Card) was the original standard for flash cards of the size and shape used in the **Sd-50/xx**. MMC flash cards have largely disappeared, replaced by the newer standard called Secure Digital (Sd). Sd flash cards are slightly thicker than MMC cards, have a 'write protect' switch on them, and a few more pins than a MMC card.

In addition to .mp3 and .wav SoundFiles, the Sd flash card usually contains the '**SdConfig.exe**' program, the configuration files it creates (**Sd-50.cfg**, **mp3-50.cfg**, **schedule.sch**, etc.). Although not needed by the **Sd-50/xx**, it is not unusual to store 'back up' copies of your shows and support files for safe keeping. In this way, if you have to return to a job site years in the future, you will have the shows and files needed to recreate and reprogram the installation.

C) Optional Clock Input (Sd-50/8, Sd-50/40)

This 2.5 mm stereo jack is used to connect the GPS receiver to the **Sd-50/8** or **Sd-50/40**. This input is optically isolated. A 'Polyswitch fuse' protected twenty-four vdc from this jack is used to power the GPS receiver.

All the **Sd-50/8s** or **Sd-50/40s** are made with the built in Real Time Clock. This allows you to schedule when sounds and shows will play using a 365 day schedule. Without the additional accuracy provided by the GPS clock, the built in RTC has an accuracy which has been laser trimmed for +/- 50 Parts Per Million (PPM). This is about the same as most modern electronic watches. Variations in temperature will cause a certain amount of variation in the accuracy of the RTC.

An external clock can be used with the **Sd-50/8** or **Sd-50/40** to assure that the internal clock is always insanely accurate. The GPS uses the atomic clocks that are in a set of satellites orbiting the Earth.

The GPS option will work anywhere on the planet. The receiver is mounted where it has a view of the sky. The [GPS receivers](#) are IPx7 rated for outdoor use, and are 'bulkhead' mounted using a single 5/8" diameter hole. The fifteen foot long cable from the GPS receiver plugs into a small GPS power module via a six pin mini-DIN connector. A three conductor cable with 2.5 mm stereo plugs at both ends is then connected between the power module and the **Sd-50/8** or **Sd-50/40**. The input to the **Sd-50/8** or **Sd-50/40** is optically isolated. You can stretch these wires for hundreds of feet, if needed.

The GPS, once it acquires a lock on the satellites orbiting overhead, takes over for the on-board Real Time Clock inside the **Sd-50/8** or **Sd-50/40**. Every 60 seconds, on the half minute, the GPS clock sets the RTC chip inside the **Sd-50/8** or **Sd-50/40**. This assures you that even if the GPS loses lock, the internal clock has been set accurately.

D) Card Cage Connection (Sd-50/0, Sd-50/8, Sd-50/40)

This female header connection is used to connect the power and secondary serial port to an **Sd-50/CC-10**. It is not used for any other purpose.

E) Power Supply (Sd-50/0, Sd-50/8, Sd-50/40)

The power supply connections to the **Sd-50/xx** are available on both a 2.1 mm power jack and two of the screw terminal positions. For mobile, permanent or higher current applications, you may wish to use the screw terminals instead of the 2.1 mm power jack. It is less prone to being accidentally unplugged or vibrating loose. The screw terminals are also a very convenient place to 'steal' a little 'juice' to power the four optically isolated inputs.

If you are not using the onboard amplifier, the **Sd-50/xx** can be run from any supply voltage from nine vdc to twenty-four vdc. If you are using the onboard amplifier, the power supply should be between twelve and twenty-four vdc. The amplifier will shut off at a hair below twelve vdc. If want to reach the maximum possible power from the amplifier, you will need to run the **Sd-50/xx** from twenty-four vdc, and use 4Ω speakers.

The Show Control outputs are powered from this supply connection as well. If you are driving twenty-four vdc loads, then run the **Sd-50/xx** on twenty-four vdc. If your loads require twelve vdc, then run the **Sd-50/xx** on twelve vdc.

The power supply connections are protected from reversed polarity. An idle **Sd-50/xx** draws only about ??? milliamperes. The onboard amplifier and loads which the **Sd-50/xx** is controlling will usually draw far more current than the **Sd-50/xx** itself. If you are using the onboard amplifier at full volume, you should allow at least 100 Watts for it, in addition to the current for controlling your animation loads (**Sd-50/8** and **Sd-50/**

40). If you hear 'clicks' or clipping on your amplifier outputs, then your power supply capacity may need to be increased.

F) DMX-512/MIDI/Net Serial In (Sd-50/8, Sd-50/40)

Two position Screw Terminals. This input can be selected for RS-422 (high-z) or optoisolated (low-z) input by a [switch on the bottom](#) of the unit. [DMX-512](#) in, [Net Serial](#) or [IR Trigger Mode](#) are normally used with the 'RS-422' position, but will also work in the optoisolated (low-z) mode. [MIDI in](#) will only work in the 'optoisolated' position.

DMX-512/MIDI Serial In connection has five possible modes of operation. These are selected through the '[SdConfig.exe](#)' program.

DMX-512 Input

The [Optoisolated/RS-422](#) switch on the bottom of the **Sd-50/8** or **Sd-50/40** can be in either position. In most cases, or if feeding multiple **Sd-50/8** or **Sd-50/40**, then the 'RS-422' position should be used.

The DMX-512 standard was developed by the United States Institute for Theatrical Technology (USITT) for a high speed (250 Kbaud) asynchronous serial data 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 (fans, strobes, chain winches, wiggle lights, etc.).

You can address your **Sd-50/8** or **Sd-50/40** to respond to any address between 0 and 511. The **Sd-50/8** or **Sd-50/40** will support all 512 possible DMX-512 channels.

If you have NOT selected DMX-512 checksums, the '[SdConfig.exe](#)' will allow you to set the addresses for DMX-512 to any address from 1 through 512. Address '1' is equivalent to address '0' if you were using checksums.

If you have enabled the DMX-512 checksum on PC•MACs, the 257th and 258th addresses are used for transmitting a checksum. The **Sd-50/8** or **Sd-50/40** will automatically sense the presence of the checksums and use them to verify that the data received from has no transmission errors in it. Once the **Sd-50/8** or **Sd-50/40** hear checksum data coming through, it will lock on this feature, and not update the outputs on any frames of data that don't have a valid checksum in them. If you address a light dimmer or other DMX-512 device to addresses 257 or 258, you will see this verification data displayed as a flickering pattern.

Even though the DMX-512 standard calls for 512 channels of data, the DMX-512 transmission from PC•MACs is currently limited to 256 eight-bit wide channels. PC•MACs will be upgraded to support more channels in the near future.

The **Sd-50/8** or **Sd-50/40** will stop playing any shows from the onboard flash memory when a valid DMX-512 signal is received.

You can optically isolate a DMX-512 signal coming into one **Sd-50/8** or **Sd-50/40**, then feed multiple **Sd-50/8s**, **Sd-50/40s**, or other DMX-512 equipment with the DMX-512 output from this unit. In this way, the upstream DMX-512 is optically isolated from the downstream DMX-512. All of the 'downstream' **Sd-50/8s** or **Sd-50/40s** should have their inputs set for RS-422. Note that the DMX-512 will be delayed by a portion of a frame's time while going through the first **Sd-50/8** or **Sd-50/40**. You don't want to feed the DMX through too many units because of this delay.

MIDI Notes Input

The [switch on the bottom](#) of the **Sd-50/8** or **Sd-50/40** must be in the optoisolated/Low-z position to be used for [MIDI in](#). The MIDI should be fed to the **Sd-50/8** or **Sd-50/40** as follows:

MIDI pin #1 = no connection

MIDI pin #2 = no connection

MIDI pin #3 = no connection

MIDI pin #4 into - DMX/MIDI In

MIDI pin #5 into + DMX/MIDI In

The **Sd-50/8** or **Sd-50/40** will respond to MIDI 'Note On', 'Note Off', 'Reset', 'All Notes Off' and 'All Sounds Off'. Running commands for 'Note On' and 'Note Off' commands are also accepted. All other defined MIDI commands will be received and promptly ignored. There are two ways the **Sd-50/8** or **Sd-50/40** can be configured to respond to MIDI Note commands.

- 1) When 'MIDI Notes Trigger Animation' checkbox is OFF, then MIDI is used to directly access the Show Control Outputs and .mp3/.wav audio files:
 - a) Any MIDI notes which are below the number you have set for the 'MIDI Offset' are ignored.
 - b) The next eight (**Sd-50/8**) or forty (**Sd-50/40**) MIDI notes are mapped directly to the 8/40 Show Control outputs. These can be used to ring mechanical bells or control animation directly from MIDI notes.
 - c) The next eight MIDI notes are sent to the 'MPU Interface' to select and trigger audio files, mute, and otherwise control the **.Mp3/.wav player**.
 - d) The remaining notes are used to directly select and play individual SoundFiles stored on the **.Mp3/.wav player**. Only note 'On' MIDI commands will have any effect on selecting and playing SoundFiles. The 'velocity' of the note will set the playback level of the triggered SoundFile, if RealTime level control has been enabled on the **.Mp3/.wav player**.

The DMX/MIDI/Serial LED will be lit once MIDI is received through this port. This LED will remain on for approximately 10 seconds after the MIDI is removed from the **Sd-50/8** or **Sd-50/40**. The **Sd-50/8** or **Sd-50/40** will stop playing any shows from the onboard flash when a valid MIDI signal is received. It will not restart automatically if the MIDI signal is removed.

- 2) When 'MIDI Notes Trigger Animation' checkbox is ON, then MIDI notes are used to directly access Animation sequences stored in the flash on the **Sd-50/8** or **Sd-50/40**. These sequences in turn can access audio files on the **.Mp3/.wav player**, as well as controlling the Show Control outputs. When operating in this mode:
 - a) Any MIDI notes which are below the number you have set for the 'MIDI Offset' are ignored.
 - b) The remaining notes are used to directly select and play individual animation sequences stored on the Show Control half of the **Sd-50/8** or **Sd-50/40**. These animation sequences can in turn select and play audio files and control audio levels on the **.Mp3/.wav player**. Only 'Note On' commands are used to select and play animated shows when operating in this mode.

The DMX/MIDI/Serial LED will be flash for 1/10 second each time a preprogrammed show is started by a MIDI note. The Show Control side of the **Sd-50/8** or

Sd-50/40 can still accept starts though the serial port and four trigger inputs while operating in this mode.

Net Serial Input

The [Optoisolated/RS-422](#) switch on the bottom of the **Sd-50/8** or **Sd-50/40** can be in either position. If feeding multiple **Sd-50/8** or **Sd-50/40**, then the 'RS-422' position should be used.

One big disadvantage of the RS-232 serial port on the **Sd-50/8** or **Sd-50/40** is that only one **Sd-50/8** or **Sd-50/40** can be attached to the same serial port at the same time. This is the unfortunate nature of a RS-232 port. If you had a bunch of **Sd-50s** in the same system, this could quickly chew up a lot of serial ports! Most of our other products use RS-422 serial ports. Along with being able to run your wires up to a mile (RS-232 is limited to about 50 feet if the wind is blowing in the right direction), RS-422 allows lots of devices to be attached to the same serial port at the same time.

Because it is not uncommon to access and control a large number of controllers on the same serial line, the DMX-512/MIDI input can be selected to turn the DMX-512/MIDI port into a multidrop Serial network. This mode parallels the data received on the DMX-512/MIDI input pins with the serial data received on the regular RS-232 serial port. The serial data is still output from the **Sd-50/8** or **Sd-50/40** still comes ONLY through the RS-232 serial port on the front to the unit.

This serial port can be used to select and play shows or AutoDownload shows from any point on the network. Since it is 100% compatible with the RS-422 serial ports on all other Gilderfluke & Company equipment, a multidrop network can consist of up to 256 **Sd-50/8** or **Sd-50/40** and any other Gilderfluke & Company devices. The only requirement is that they all be set to unique addresses.

Since RS-422 is probably the most widely used of industrial data networks, a myriad of other pieces of equipment are available which will also work with the Net Serial mode. These allow you to do tricks like controlling the **Sd-50/8** or **Sd-50/40** through a wireless modem using off-the-shelf hardware.

A typical application is to use a touch screen operator interface to access and play shows. These generally use a user definable graphical interface. You pretty much draw a button, and then attach a string to it. When this on-screen button is pushed, this string is sent out to control the downstream equipment.

IR Input Mode

The [Optoisolated/RS-422](#) switch on the bottom of the **Sd-50/8** or **Sd-50/40** can be in either position, but RS-422 is preferred. This turns on a special serial port mode on the **Sd-50/8** or **Sd-50/40** which allows it to be used with our InfraRed Transmitters and Receivers. The IR Remote mode is typically used to trigger an animation or sound system mounted on a vehicle, turntable, or other installation where wires can't be used. The DMX-512/MIDI port is forced to 1200 baud and all serial port commands are disabled on the DMX-512/MIDI port when this mode is ON. Any binary show number received by the serial port for more than ten times will trigger the requested show. Typically the transmitters are placed along the path of the vehicle's travel to trigger the appropriate animation sequences at the appropriate times.

The connections to the IR Remote Receiver are as follows (view is facing end of cable with latch up):

	NAME	COLOR	SIGNAL FUNCTION
LEFT	Ground	WHITE	Ground
	n/c	BLACK	no connection

	NAME	COLOR	SIGNAL FUNCTION
	n/c	RED	no connection
	- TxD	GREEN	- DMX-512/MIDI Input
	+ TxD	YELLOW	+ DMX-512/MIDI Input
RIGHT	Ground	BLUE	Ground

In addition to these connections, the IR Receiver requires a seven to twenty-four volt DC (Direct Current) power supply connection. This is normally attached to the two pads marked “+” and “-” on the receiver, or can be brought into the IR Receiver through the Black, Red or Blue Rj-12 wires. A jumper option allows you to bring this in through the blue wire on the RJ-11 connector.

When in this mode the ‘Early Starts’ for all shows should be set to ‘NOT Steppable’. If this is not done, then the same show will be re-triggered over and over again until the vehicle moves out of the IR beam from the transmitter.

The IR Transmitter has an eight position dipswitch which sets which show it selects. The lower nibble of the address is set with the first four switches, and the upper nibble is set with the last four. Valid show numbers are 01h through FFh:

Lower nibble of Address	Switch #1	Switch #2	Switch #3	Switch #4
x0h	OFF	OFF	OFF	OFF
x1h	ON	OFF	OFF	OFF
x2h	OFF	ON	OFF	OFF
x3h	ON	ON	OFF	OFF
x4h	OFF	OFF	ON	OFF
x5h	ON	OFF	ON	OFF
x6h	OFF	ON	ON	OFF
x7h	ON	ON	ON	OFF
x8h	OFF	OFF	OFF	ON
x9h	ON	OFF	OFF	ON
xAh	OFF	ON	OFF	ON
xBh	ON	ON	OFF	ON
xCh	OFF	OFF	ON	ON
xDh	ON	OFF	ON	ON
xEh	OFF	ON	ON	ON
xFh	ON	ON	ON	ON

Upper nibble of Address	Switch #5	Switch #6	Switch #7	Switch #8
0xh	OFF	OFF	OFF	OFF
1xh	ON	OFF	OFF	OFF
2xh	OFF	ON	OFF	OFF
3xh	ON	ON	OFF	OFF
4xh	OFF	OFF	ON	OFF
5xh	ON	OFF	ON	OFF
6xh	OFF	ON	ON	OFF
7xh	ON	ON	ON	OFF
8xh	OFF	OFF	OFF	ON
9xh	ON	OFF	OFF	ON

Upper nibble of Address	Switch #5	Switch #6	Switch #7	Switch #8
Axh	OFF	ON	OFF	ON
Bxh	ON	ON	OFF	ON
Cxh	OFF	OFF	ON	ON
Dxh	ON	OFF	ON	ON
Exh	OFF	ON	ON	ON
Fxh	ON	ON	ON	ON

IR MultiLingual Mode

The Sd-50s feature a multilingual mode for installations where the same IR triggers need to call up different Shows/SoundFiles. Most commonly, this is used to select among a bunch of different languages on an attraction. It works in conjunction with the IR receiver to modify the ShowFile or SoundFile that the IR receiver triggers. Up to fifteen languages can be supported.

To select the language, a switch is attached to the J8 input(s). If two languages are used, then this switch is attached to just the 'A' input. If more languages are to be supported, then a 'binary' pattern switch is attached to the J8 port to make the language selections using two, three or all four of the J8 inputs (depending on the number of languages needed). This switch is usually set by the ride operators or guests at the beginning of the show, but can be switched at any point in the show if desired.

IR mode and the majority of settings are entered using the Mp3 Configurator program, just like normal, and the shows are programmed using PC•MACs, just like normal. You will need to program additional Shows/SoundFiles to allow for each language used.

The Multilingual mode is set up using GilderTerm to talk to the Sd-50/8 or Sd-50/40 directly. On the second page of the configuration menu, the number of languages to support is entered into eeFlag5:

The number of languages to use is entered in HEXadecimal into eeFlag5. Valid values are 2 through 15 (02h through 0Fh). Values of 0 or 1 are ignored.

The Show/SoundFile number requested (from the IR serial port) is multiplied by the number of languages (from eeFlag5). The result is then added to the input from the J8 port (unused inputs from the J8 port are masked off based on the number of languages used).

The actual formula is $(\text{IR Request}-1) \times (\text{number of languages}) + (\text{Language number requested on J8 port}+1) = \text{Show/SoundFile number played}$

For 2 languages, only one input on the J8 port is used: J8 input A_green_Input_0 selects which language plays (open = language a, closed = language b)

For 3-4 languages, two inputs on the J8 port are used: J8 input A_green_Input_0 and B_red_Input_1 selects which language plays (0=a, 1=b, 2=c, 3=d)

For 5-8 languages, three inputs on the J8 port are used: J8 input A_green_Input_0, B_red_Input_1 and C_Blue_Input_2 selects which language plays (0=a, 1=b, 2=c, 3=d, 4=e, 5=f, 6=g, 7=h)

For 9-15 languages, all four inputs on the J8 port are used: J8 input A_green_Input_0, B_red_Input_1, C_Blue_Input_2 and D_White_Input_3 selects which language plays (0=a, 1=b, 2=c, 3=d, 4=e, 5=f, 6=g, 7=h, 8=i, 9=j, 10=k, 11=l, 12=m, 13=n, 14=o, 15=p)

Example #1: If 4 languages are needed, the value '04' would be entered into eeFlag5

- 1a) If a binary value of '2' is entered into the J8 port to select language 'c', then an IR request for Show/SoundFile #1 results in Show/SoundFile #3 being requested and played.
- 1b) If the IR Trigger request Show/SoundFile #2 be played, then Show/SoundFile #7 will be requested and played.
- 1c) If the IR Trigger request Show/SoundFile #10 be played, then Show/SoundFile #39 will be requested and played.

Example #2: Under the same conditions as in the example #1 above, but with the 'language select' inputs set to language 'b':

- 2a) IR request for Show/SoundFile #1 results Show/SoundFile #2 requested and played.
- 2b) IR request for Show/SoundFile #2 results Show/SoundFile #6 requested and played.
- 2c) IR request for Show/SoundFile #10 results Show/SoundFile #38 requested and played.

Example #3: Another way to look at it is (again using the four languages from example #1):

- 3a) An IR request for Show/SoundFile #1 will play Show/SoundFiles 1, 2, 3 or 4, depending on the 'language select' inputs to the J8 port.
- 3b) An IR request for Show/SoundFile #2 will play Show/SoundFiles 5, 6, 7 or 8, depending on the 'language select' inputs to the J8 port.
- 3c) An IR request for Show/SoundFile #3 will play Show/SoundFiles 9, 10, 11, or 12, depending on the 'language select' inputs to the J8 port.
- 3d) An IR request for Show/SoundFile #4 will play Show/SoundFiles 13, 14, 15 or 16, depending on the 'language select' inputs to the J8 port.
-
- 3j) An IR request for Show/SoundFile #10 will play Show/SoundFiles 37, 38, 39 or 40, depending on the 'language select' inputs to the J8 port.

The only thing that the MultiLingual mode will not do is start a new show if the 'language select' switch is thrown in the middle of a Show/SoundFile, unless the IR receiver is still in range of the IR transmitter (and the Show/SoundFile is set as 'steppable'). In general, restarting a show in the middle is not the sort of thing that is generally desired. If there is a ride vehicle or other timed element involved, it too would be recycled back to the beginning of the scene.

What the MultiLingual mode will do if the language switch has been thrown is to play the newly requested language on the very next IR trigger.

None

If the DMX-512/MIDI input is not being used, then the DMX-512 transmission is enabled on the DMX-512/MIDI output terminals.

G) DMX-512 Output (Sd-50/8, Sd-50/40)

Two position Screw Terminals. DMX-512 is transmitted on this pair of screw terminals. The DMX-512 standard was developed by the United States Institute for Theatrical Technology (USITT) for a high speed (250 Kbaud) asynchronous serial data 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 (fans, strobes, chain winches, wiggle lights, etc.).

- a) If running from RealTime updates through the RS-232 serial port, the DMX-512 data will always start with the channel '0' (which is channel '1' on most dimmers). Data after the sixteenth channel will be padded with '0' values through the 256th byte, and then followed by two checksum bytes (if enabled).

The Show Control Outputs, Audio Level Control, And Repeater Control channels typically overlap with some of the lighting control channels when operated in this mode.

- b) If running from a show file which has been AutoDownloaded to the **Sd-50/8** or **Sd-50/40's** flash memory, the 'first address' of the downloaded data will be the first DMX-512 channel to have your programmed data in it. Channels before and after the AutoDownload data will be padded with '0' values up until the 256th bytes sent, followed with a two byte checksum (if enabled). Following this will be any additional data stored in the AutoDownload file, if there is any. After the end of the data in the AutoDownload file, any remaining channels will be padded out through the 512th channel.

The Show Control Outputs, Audio Level Control, And Repeater Control channels often overlap with some of the lighting control channels when operated in this mode.

- c) If running from DMX-512 input data, the DMX-512 data will always start with the channel '0' (which is channel '1' on most dimmers). After the 256th DMX-512 channel is sent, there will be a two byte checksum (if enabled). Following this will be any additional data from the received DMX-512 data, if any. After the end of the DMX-512 data, any remaining channels will be padded out through the 512th channel.

H) Left Speaker Output (Sd-50/0, Sd-50/8, Sd-50/40)

I) Right Speaker Output (Sd-50/0, Sd-50/8, Sd-50/40)

Four position Screw Terminals. These are the two outputs of the **Sd-50/xx's** onboard Class-D amplifier. This amplifier's efficiency is near 90%. If you feed 100 Watts of twenty-four vdc into the **Sd-50/xx's** amplifier, you will get almost 100 Watts into your speakers. 'Linear' amplifiers have only about 20% efficiency. Fully 80% of the power you put into them goes into the heatsink as waste heat. A 100 Watt linear amplifier would only feed 20 Watts of power into your speakers, and 80 Watts into the heatsink. This makes the **Sd-50/xx's** amplifier roughly equivalent to what would be a 400 to 500 Watt linear amplifier!

If you are going to run your speakers at high SPLs, you will need to select speakers that can handle at least a 250 Watts or more of continuous power each. Smaller speakers may clip or be damaged if run at too high an output power level from the **Sd-50/xx**. Maximum output power is achieved with a pair of four ohm speakers (or two pairs of eight ohm speakers, connected in parallel).

The amplifier outputs from the **Sd-50/xx** can be used with speakers of four to eight ohms impedance. As with any amplifier, you can series/parallel a number of speakers, so long as the impedance remains within limits.

The **Sd-50/xx's** amplifier is well protected from short circuits and overheating, and will go back to work a moment after a fault is removed. If the speaker impedance is too low and you are running at a high volume level, the amplifier may start to cut out. If you hear this, check the power supply voltage. If the input voltage is dropping, you might simply be drawing too much power for the power supply and a larger supply

may fix your problem. If the power supply is OK, and you can't increase the speaker impedance, then you might simply be asking too much of the **Sd-50/xx**'s amplifier, and need to turn down the volume a tad.

If you wish to comply with FCC and CE standards for radio frequency emissions, you should use shielded speaker wires with the **Sd-50/xx**. The shield should be attached to the power supply 'negative' terminal, which is immediately adjacent to the speaker terminals. This will not affect the sound quality from the **Sd-50/xx**, but will make the FCC and CE folks happy. Shielded speaker lines were used during all CE/ FCC certification testing.

External amplifiers can be fed from the Line Level Outputs if more power than this is needed.

J) Left Line Output (Sd-50/0, Sd-50/8, Sd-50/40)
K) Right Line Output (Sd-50/0, Sd-50/8, Sd-50/40)

Female RCA jacks. These are the two line level outputs from the **.Mp3/wav player**. They are used for attaching an external amplifier to the **Sd-50/xx**.

L) '¼ J6' Inputs/Outputs (Sd-50/0, Sd-50/8, Sd-50/40)

Ten position IDS Connector. Note that this individual pins on this port can be used as inputs or outputs. If a pin is being used for one, it is not normally used as the other at the same time.

Each '¼ J6' cable is arranged in the following order:

wire function	wire number	color
circuit ground	1	brown
Input/Output data bit #7	2	red
Input/Output data bit #6	3	orange
Input/Output data bit #5	4	yellow
Input/Output data bit #4	5	green
Input/Output data bit #3	6	blue
Input/Output data bit #2	7	violet
Input/Output data bit #1	8	gray
Input/Output data bit #0	9	white
+ vdc unregulated power supply	10	black

Depending on the type of **Sd-50/xx**, this connection can serve a number of different functions:

Sd-50/0: These pins are used to connect to the eight optically isolated trigger inputs which are used to select SoundFiles, start, mute, half mute, pause, or unmute the **.Mp3/wav player**. What each of these pins will do is set using the [Input Setup](#) tab in the **SdConfig.exe**' program.

Sd-50/8: This connector is used for eight optically isolated trigger inputs AND eight Show Control Outputs.

These inputs can be used to trigger, mute, unmute, etc. the **.Mp3/wav player**, or to request and play shows from the Show control half of the **Sd-50/8** or **Sd-50/40**.

These are not normally used as inputs on **Sd-50/8s** or **Sd-50/40s**. They are typically configured not to do anything using the [Input Setup](#) tab in the **SdConfig.exe**' program. The [Animation 'Virtual' MCU Trigger](#) channel is used instead for controlling the Audio Playback (using the [Animation Input Setup](#) tab in the **SdConfig.exe**' program). This leaves all eight of these pins available for Show Control Outputs.

An exception to this is when you need to use an actual switch input independent of the show that is being run to mute or stop the audio. An example of this would be a switch input to half-mute the audio during PA announcements. The input to the **.Mp3/.wav player** is configured for the desired function using the [Input Setup](#) tab in the **SdConfig.exe** program. The corresponding Show Control output is usually programmed so that it never goes active, so that it does not interfere with the operation of the **.Mp3/.wav player**. If the Show Control output does go active, it will have the same effect as an externally attached switch would have.

These eight inputs can be used to select and play individual shows using a individual bits or binary patterns on the inputs. They are used for starting shows only when more than the four '[J8](#)' inputs are needed.

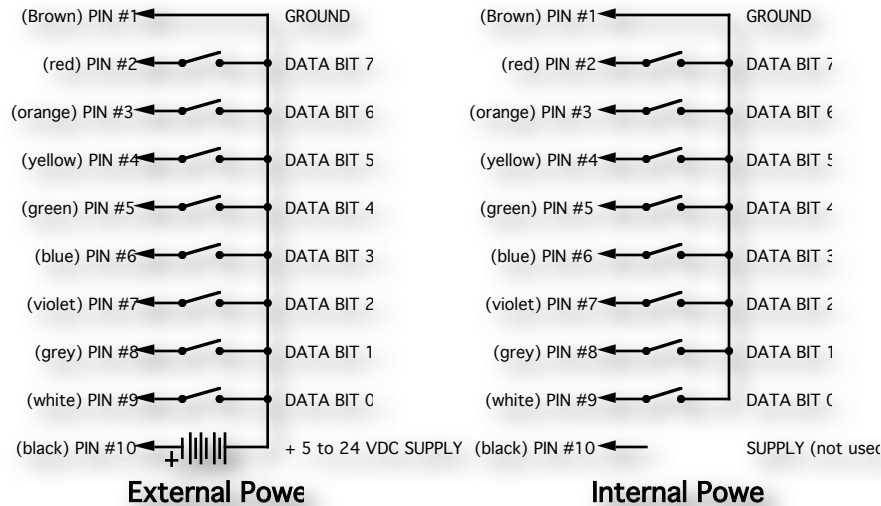
The individual bits of the '¼ J6' port can also be selected to use as ServoMotor PWM outputs. When a pin used for ServoMotor PWM outputs, it is unavailable for either input to trigger sounds and shows, or as a standard Show Control Output.

Sd-50/40: This connector is also used as the optically isolated trigger inputs the **.Mp3/.wav player**, and the last eight of the forty Show Control outputs. Other than that, it is identical to an **Sd-50/8**.

Outputs via the '¼ J6' port

The eight pins of the '¼ J6' port can be used as digital Show Control output for the on/off control of solenoid valves, relays, lights or anything else that can be controlled by an electrical signal. In every way the '¼ J6' port outputs are identical to the normal '[J6](#)' port found on the **Sd-50/40**. Details on the connection can be found there.

Inputs via the '¼ J6' port



For an **Sd-50/0**, the '¼ J6' input is strictly an **.mp3/.wav** input. It is optically isolated. It can be set to run from an external power source or the same power as the **Sd-50/xx** (default configuration). This is selected by moving the [switch](#) on the bottom of the **Sd-50/xx**. The 'external' setting is used when you want to completely isolate the **Sd-50/xx** from the switch closures that control it.

The input from **Kp-200** keypad(s) to the '¼ J6' input is a 'straight wire', using a ten position ribbon cable and a 10-IDS connector at each end of the connection. If you want to optoisolate the connection, attach a nine to twenty-four vdc power supply to the **Kp-200**, and throw the switch on the bottom of the **Sd-50/8** or **Sd-50/40** into the 'isolated' position. If you don't need to optoisolate the **Kp-200**, then put the switch on the bottom of the **Sd-50/8** or **Sd-50/40** into the 'internal' power

position. The **Kp-200** needs no power other than what it will get from the **Sd-50/8** or **Sd-50/40** through the '¼ J6' cable.

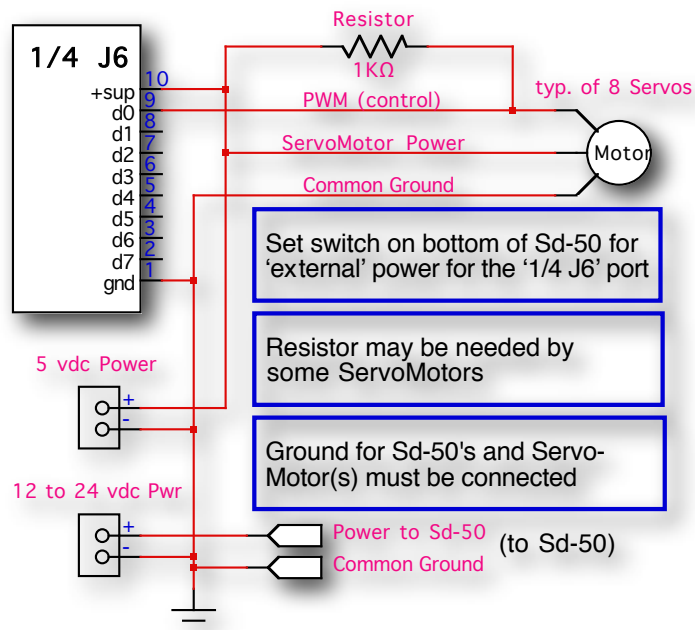
On an **Sd-50/8** or **Sd-50/40**, this input/output is almost always run in the 'Internal' power mode. The only exception to this is if you are going to be running the devices controlled by these eight Show Control outputs from a different voltage from the rest of the **Sd-50/8** or **Sd-50/40**. As an example, if the **Sd-50/8** or **Sd-50/40** is running from twenty-four vdc, and you need to control eight twelve vdc relays, you can power this one port from a twelve vdc power supply separate from the main one (you will need to connect the grounds of the two power supplies).

ServoMotor PWM via the '¼ J6' port

If you are running typical ServoMotors, you have two ways to connect them. The first way is used if you don't need to use any of the other pins on the '¼ J6' port for anything other than ServoMotors. The second is used if you need to use some of the pins of the '¼ J6' port for other purposes than ServoMotors:

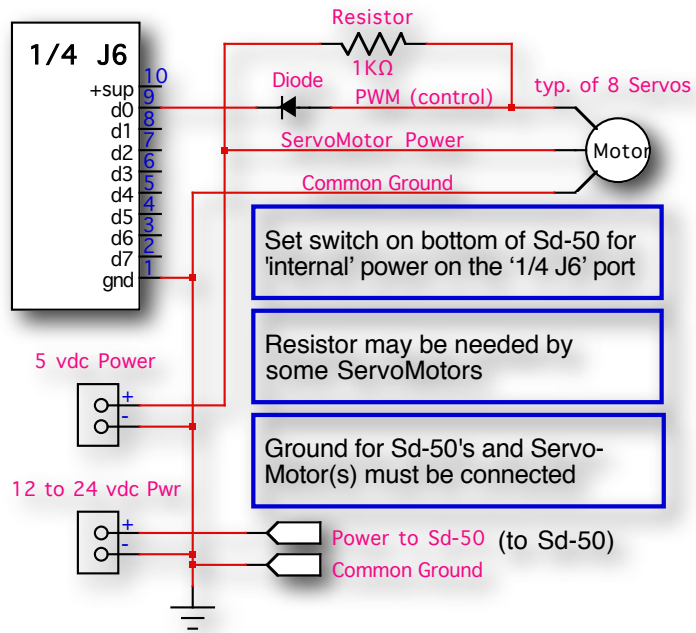
1. When running ONLY ServoMotors on the '¼ J6' connector, the **Sd-50/8** or **Sd-50/40** is run from a

typical twelve to twenty-four vdc power supply, just as you would normally do. A separate five vdc power supply used to provide power to the ServoMotor(s). Select 'external' power for the '¼ J6' port by moving the [switch](#) on the bottom of the **Sd-50/xx**. Run positive five vdc into pin #10 of the '¼ J6' connector and the ground side of the five vdc power supply into pin #1 of the '¼ J6' connector. The positive five vdc is also connected to the power and ground pins of the ServoMotor. The 'grounds' of both power supplies must be connected together. The ServoMotor's PWM 'control' pin is attached to the output pin that is being used for providing the ServoMotor the PWM control signal it needs. Since the '¼ J6' port is running on the external five vdc power, this largely precludes using any of the other pins on this port for anything other than ServoMotor PWM outputs.



2. When running a mix of ServoMotor(s) and other functions on the '¼ J6' connector, the ServoMotors must be protected from the 12 to 24 vdc that is running the other functions. The **Sd-50/8** or **Sd-**

50/40 is run from a typical twelve to twenty-four vdc power supply, just as you would normally do. A separate five vdc power supply used to provide power to the ServoMotor(s). Select 'Internal' power for the '1/4 J6' port by moving the [switch](#) on the bottom of the **Sd-50/xx**. The positive five vdc and ground pins from the five volt power supply are connected to the power and ground pins of the ServoMotor. The 'grounds' of both power supplies must be connected together. The ServoMotor's PWM 'control' pin is attached to the output pin that is being used for providing the ServoMotor the PWM control signal it needs through a small signal diode. Typical diodes are 1N4148 or 1N914, but almost any diode will work. The 'cathode' end of the diode (indicated by the stripe) is towards the connector on the **Sd-50/8** or **Sd-50/40**. This diode keeps the higher voltage that is running the **Sd-50/8** or **Sd-50/40** from getting to the ServoMotor. Any input/output pins on this port that are not being used for ServoMotor PWM can be used for normal input or output.

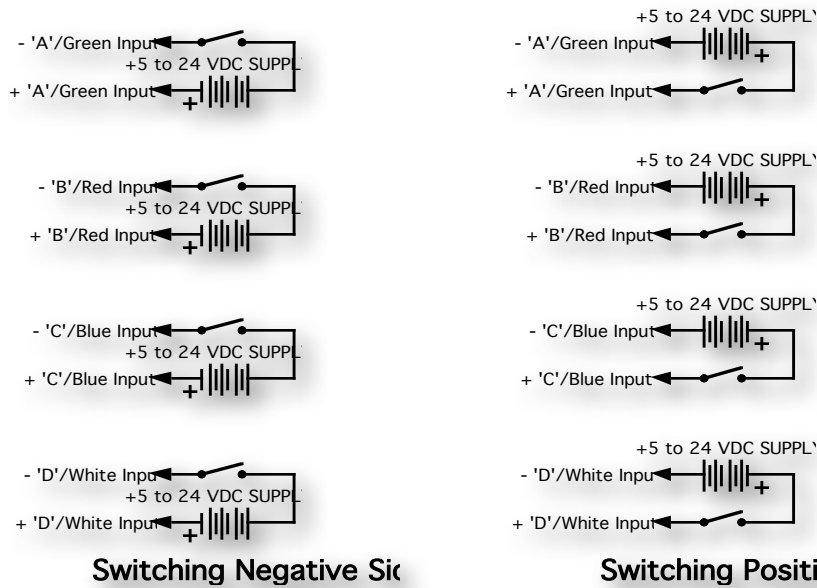


The 'cathode' end of the diode (indicated by the stripe) is towards the connector on the **Sd-50/8** or **Sd-50/40**. This diode keeps the higher voltage that is running the **Sd-50/8** or **Sd-50/40** from getting to the ServoMotor. Any input/output pins on this port that are not being used for ServoMotor PWM can be used for normal input or output.

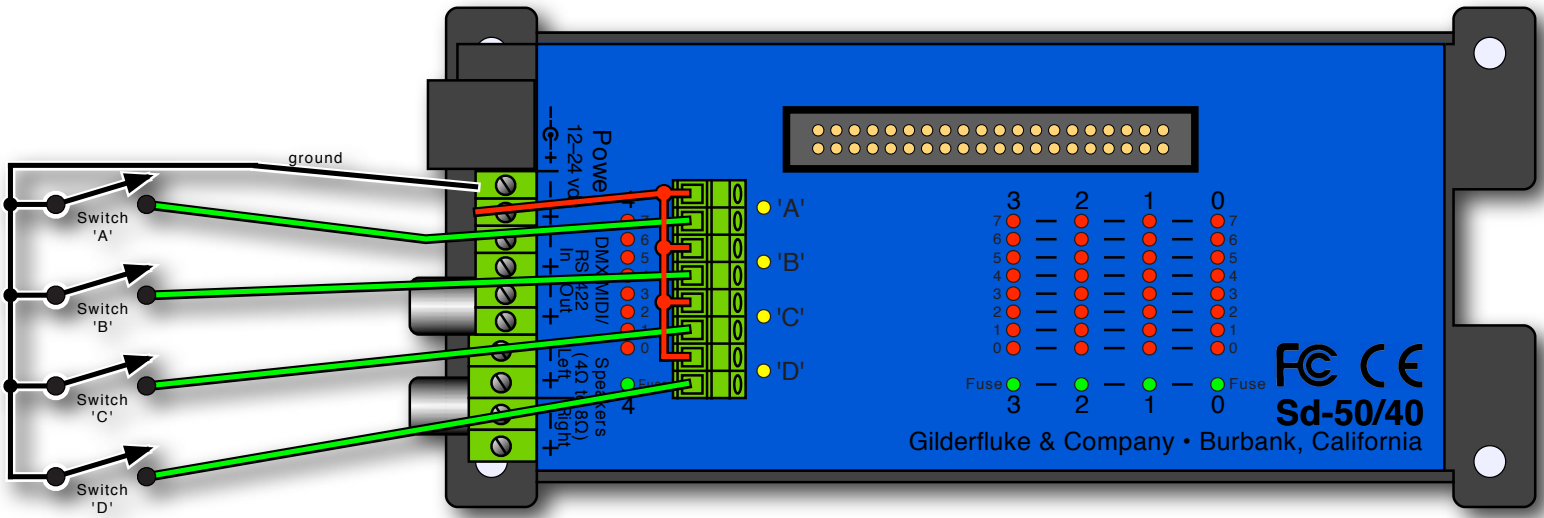
ServoMotors are typically run at somewhere around five vdc. If your ServoMotor is made to run at a different voltage than this (twelve to twenty-four vdc), it will likely be a very big, strong, and heavy-duty motor with separate power and control connections. Typically power for such a ServoMotor will be the same twelve or twenty-four vdc that the **Sd-50/8** or **Sd-50/40** thrives on. Connect the motor as shown in its instructions. The PWM input (the part that connects to the **Sd-50/8** or **Sd-50/40**) is still likely to be run at five vdc, rather than the higher voltage that the ServoMotor is run at. Check the specifications for the motor you are using before you run twelve to twenty-four vdc into the PWM input on the ServoMotor.

M) J8 'A', 'B', 'C' & 'D' inputs (Sd-50/8, Sd-50/40)

These are four non-polarized optically isolated digital inputs which can be used to start, stop, pause or select specific show sequences to play on the Show Control of the **Sd-50/8** or **Sd-50/40**.



In most cases, you will simply be ‘borrowing the power for these switches from the adjacent power terminals:



Any event can be triggered on either the ‘closing’ or ‘opening’ edge of any input. A ‘closing’ is when you apply a voltage to an input. An ‘opening’ is when that voltage is removed. The inputs can be triggered on any voltage from five to twenty-four vdc. If you don’t have an external source of power for these two inputs, you can ‘steal’ some juice from the **Sd-50/8s** or **Sd-50/40s** power supply connections. Conveniently, there are ‘power’ screw terminals immediately adjacent. You can pick up whatever power is being used to run the **Sd-50/8** or **Sd-50/40** from these two screw terminals.

These four inputs are uncommitted optoisolators. Effectively, you are sending the external control signal into a LED which has a resistor wired in series. This requires external power be supplied from somewhere. If the device you are controlling the input from supplies power, then all is well. If you are wiring these inputs to simple dry switch closures, you will need to ‘steal’ the power for them from somewhere.

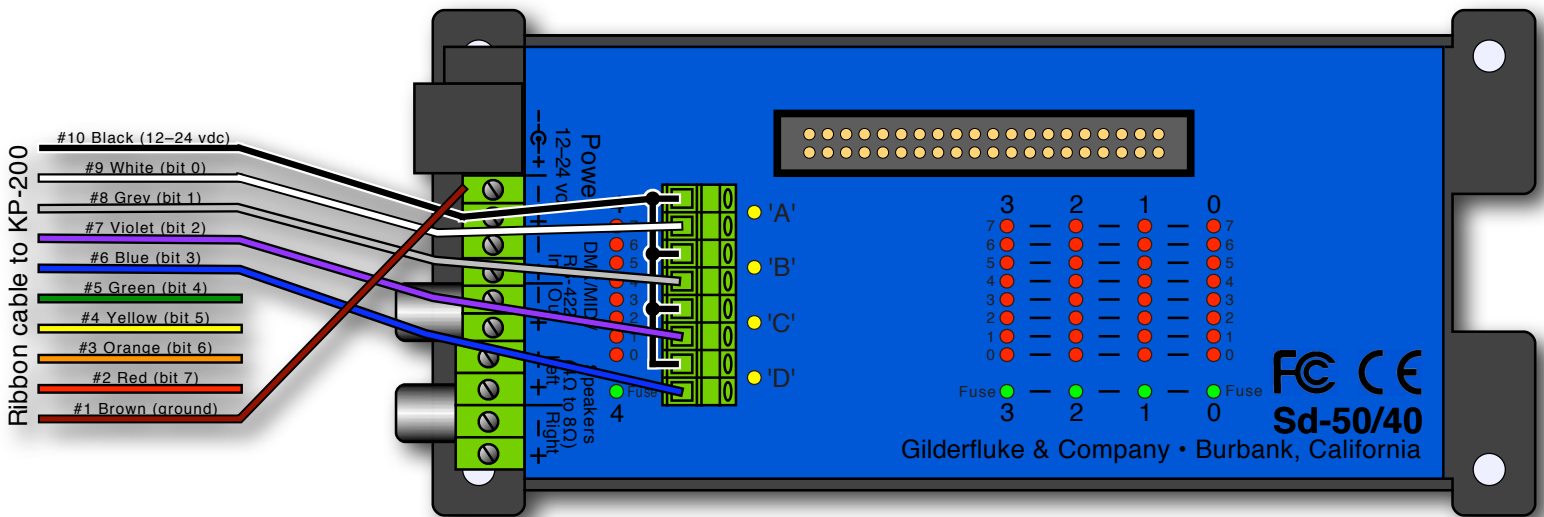
J8 ‘A’, ‘B’, ‘C’ & ‘D’ Binary:

The four optically isolated digital inputs can be used to select up to fifteen different shows directly with a binary weighted pattern of bits. If you need direct access to more than fifteen shows, use the ‘[¼ J6](#)’ input instead of the ‘J8’ inputs.

To use the 'J8' inputs for binary show selections, you must set all four of these inputs (both opening & closing edges) as 'unused' when you generate your AutoDownload file from PC•MACs. The binary pattern is applied as follows:

Show #	'A'	'B'	'C'	'D'	comment
0	off	off	off	off	(there ain't no show '0')
1	on	off	off	off	
2	off	on	off	off	
3	on	on	off	off	
4	off	off	on	off	
5	on	off	on	off	
6	off	on	on	off	
7	on	on	on	off	
8	off	off	off	on	
9	on	off	off	on	
10	off	on	off	on	
11	on	on	off	on	
12	off	off	on	on	
13	on	off	on	on	
14	off	on	on	on	
15	on	on	on	on	

If you are using our **KP-200** for selecting and playing shows, it is wired as follows. The connection to the **KP-200** is through a ten position ribbon cable. Power for the **KP-200** in this example is being 'borrowed' from the **Sd-50/8** or **Sd-50/40**. If you are going to be running the cable from the **KP-200** to the **Sd-50/8** or **Sd-50/40** a long distance, or if you are picking up audio 'noise' through this input, you can use a separate power supply to completely isolate the **KP-200** and the **Sd-50/8** or **Sd-50/40**.



The 'D'/'White' input can be used to disable scans of the RTC schedules when the input is opened. This can be used to stop sounds and shows from playing automatically when they shouldn't. Examples of where this feature can be used are:

- In a church bell tower, where a simple switch opening can be used to temporarily disable bells from ringing during a service.

- b) In a Theme Park or museum, where this input can be tied to the existing power management grid to disable scheduled shows and sounds when the attraction is closed.

If you have a show or sound which should not be interrupted by a scheduled event. You can set the show/sound so that it 'can not' be stepped on. The schedule may try to start a show or sound, but the request will not be honored if it has been set as 'unsteppable'.

N) 'J6' Show Control Outputs (Sd-50/40)

Forty Position IDS Connector. Each **Sd-50/40** has forty outputs. This connector is used for the first thirty-two outputs. The last eight appear on the '[¼ J6](#)' connector on the back of the **Sd-50/40**.

These 'J6' Show Control outputs are identical to the standard outputs used on all Gilderfluke & Company Show Control Systems. Forty and ten position transition connectors are available for the **Sd-50/8s** or **Sd-50/40s** to adapt the ribbon cables to screw terminals, and are included in the 'starter kit'.

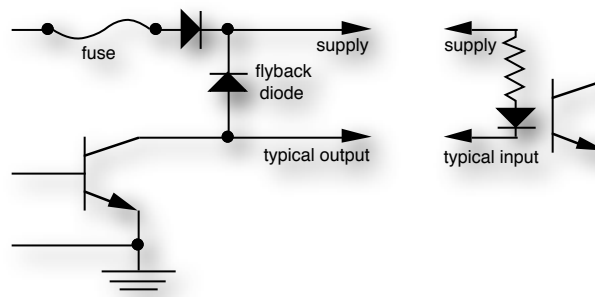
The output connections for all Gilderfluke & Company Show Control Systems are through 'J6' output cables. These are forty wire ribbon cables which are made up of four identical eight-bit wide 'channels'. A 'J6' cable is often split up into four individual channels. Each '[¼ J6](#)' ribbon cable is made up of ten wires, and can be used to control eight individual 'digital' (off/on) devices, or one eight-bit wide 'analog' device. Each group of ten wires also includes a common power supply and ground wire.

To simplify wiring to any Gilderfluke animation system, the connectors used on the '[¼ J6](#)' cables are what are called 'insulation displacement' (IDS) connectors. These simply snap on to an entire cable, automatically 'displacing' the wire insulation and making contact with the wires within. This means that an entire ten wire cable can be terminated in seconds. All connectors are polarized, to keep them from being plugged in backwards. Although there are tools made specifically for installing these connectors, the tool we find works best is a small bench vise.

If attaching discrete wires from the 'J6' ribbon cable connector presents a problem, we have forty and ten position transition connectors are available for the **Sd-50/8s** or **Sd-50/40s** to adapt the ribbon cables to screw terminals. Ribbon cable to screw terminal adapters are also available from a number of different sources.

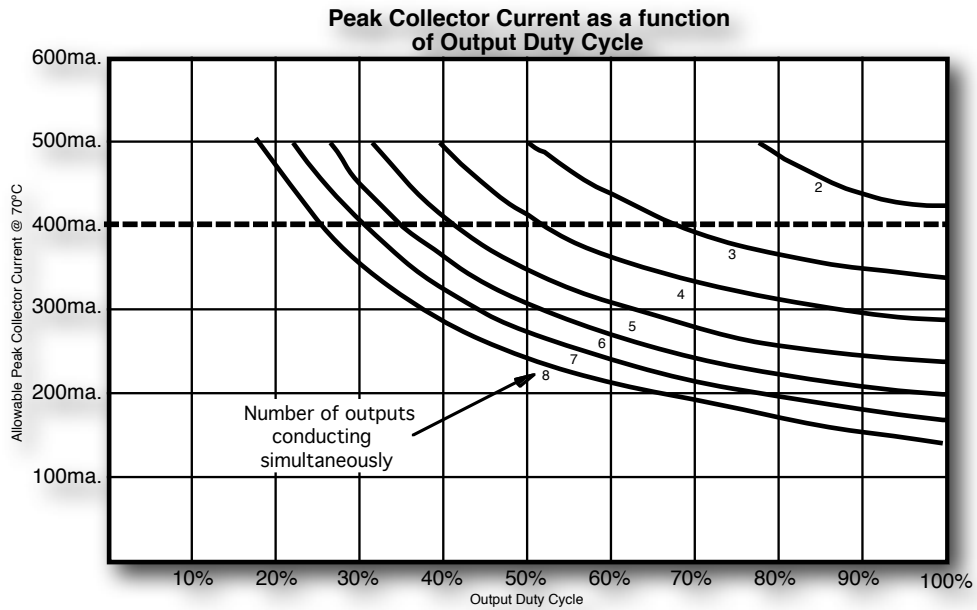
Any eight digital devices or one eight-bit analog device can be connected to any '[¼ J6](#)' cable as shown. The LED between the ground (pin #1 brown) wire and supply (pin #10 black) wire acts as an indicator that is lit if the fuse for that channel is OK.

All outputs are open collector switches to ground. Each output is individually protected from over current conditions and transient spikes. Flyback diodes are included in the outputs for driving inductive loads. Larger inductive loads may require flyback diodes be installed directly across the loads. Power is supplied through a diode and a solid state circuit breaker to the common pin(s) on the connector. A safe level of current is 150 milliamperes simultaneously on each output. This is sufficient to drive most small relays, valves and other similar loads directly. If fewer than eight outputs are on at one time, then the outputs are rated as shown in the following chart.



The supply line for each ¼ J6 is 'Polyswitch fused' for one amp. You should treat each ¼ J6 as an individual, and not cross the outputs or supply lines from one channel to the lines from any other channel. Doing this won't cause any damage, but can reduce the protection for the outputs that the fuses normally provide.

The current Output Capacity of each output is as shown in the following chart:



Each 'J6' cable is arranged in the following order:

wire function	wire number	color
circuit ground	1	brown
channel 0 data bit #7	2	red
channel 0 data bit #6	3	orange
channel 0 data bit #5	4	yellow
channel 0 data bit #4	5	green
channel 0 data bit #3	6	blue
channel 0 data bit #2	7	violet
channel 0 data bit #1	8	gray
channel 0 data bit #0	9	white
+ vdc unregulated power supply	10	black
circuit ground	11	brown
channel 1 data bit #7	12	red
channel 1 data bit #6	13	orange
channel 1 data bit #5	14	yellow
channel 1 data bit #4	15	green
channel 1 data bit #3	16	blue
channel 1 data bit #2	17	violet
channel 1 data bit #1	18	gray
channel 1 data bit #0	19	white
+ vdc unregulated power supply	20	black
circuit ground	21	brown
channel 2 data bit #7	22	red
channel 2 data bit #6	23	orange
channel 2 data bit #5	24	yellow
channel 2 data bit #4	25	green
channel 2 data bit #3	26	blue
channel 2 data bit #2	27	violet
channel 2 data bit #1	28	gray
channel 2 data bit #0	29	white
+ vdc unregulated power supply	30	black
circuit ground	31	brown
channel 3 data bit #7	32	red
channel 3 data bit #6	33	orange
channel 3 data bit #5	34	yellow
channel 3 data bit #4	35	green
channel 3 data bit #3	36	blue
channel 3 data bit #2	37	violet
channel 3 data bit #1	38	gray
channel 3 data bit #0	39	white
+ vdc unregulated power supply	40	black

If the loads you are controlling with the **Sd-50/8** or **Sd-50/40** controller are at a higher voltage and/or current than it will provide directly, then relays can be added on the Show Control Outputs (or DMX-512 Outputs) to control any sized loads.

You can provide these relays yourself, or Gilderfluke & Co. has several ready-to-use relay boards available:

DPDT relay board: A set of eight electromechanical relays with double pole/double throw contacts rated at five amps each. Connected to the **Sd-50/8** or **Sd-50/40** controller by a '[¼ J6](#)' ribbon cable from the Digital Show Control outputs.

Reed relay board: A set of eight small electromechanical relays with normally open contacts rated at 150 ma each. Connected to the **Sd-50/8** or **Sd-50/40** controller by a '[¼ J6](#)' ribbon cable from the Digital Show Control outputs.

Solid State Relay Fanning Strip: For connecting up to eight popular 'hockey puck' style relays to a '[¼ J6](#)' output cable. These are available with capacities of up to 75 amps each. Connected to the **Sd-50/8** or **Sd-50/40** controller by a '[¼ J6](#)' ribbon cable from the Digital Show Control outputs.

Pb-08, Pb-16, Pb-24 or Pb-32: Small AC (Alternating Current) or DC (Direct Current) relays rated for 3.5 amps each. Each relay is protected by an easily replaced standard fuse. Connected to the **Sd-50/8** or **Sd-50/40** controller by a '[J6](#)' ribbon cable from the Digital Show Control outputs.

Pb-DMX/08, Pb-DMX/16, Pb-DMX/24 or Pb-DMX/32: Small AC (Alternating Current) or DC (Direct Current) relays rated for 3.5 amps each. Each relay is protected by an easily replaced standard fuse. Connected to the **Sd-50/8** or **Sd-50/40** controller by a single twisted pair of wires from the DMX-512 outputs.

LC-8SP: A set of eight solid state relays with mounted in a 19" rack mountable metal box. Line cord in, and eight individual duplex outlets for connecting you loads. Connected to the **Sd-50/8** or **Sd-50/40** controller by a '[¼ J6](#)' ribbon cable from the Digital Show Control outputs.

Defaults for Sd-50/0s, Sd-50/8s and Sd-50/40s

Although almost everything can be adjusted on an **Sd-50/xx**, almost all applications will be able to use the 'default' settings. There are a number of ways to get an **Sd-50/xx** to load to the default settings:

- a) In the '**SdConfig.exe**' program, you can select the type of player you are using from the 'player type' menu at the top of the window. Under the Edit menu, select 'Reset Everything to defaults'. Save the new configuration to the Sd flash card you will be using. When you move this Sd flash card to the **Sd-50/xx**, it will load this configuration.
- b) If you have an Sd flash card inserted in the **Sd-50/xx**, but that card does not have an **Sd-50.cfg** file on it, the **Sd-50/xx** will create a default audio configuration. These defaults will only affect the **.Mp3/.wav player**. The settings for the animation playback can be adjusted from using GilderTerm through the **Sd-50/xx's** serial port. Once you have entered the configuration mode for the **Sd-50/xx**, you can select the 'reload defaults' command to reload the defaults for the animation playback too. Changes you make in the configuration through the serial port and GilderTerm will 'stick' until you change them again, or you insert a card with an **Sd-50.cfg** file loaded on it. The **Sd-50/xx** will load any **Sd-50.cfg** file as soon as it finds one.

Sd-50/0 (audio only) Defaults

[Volume to defaults](#). All sounds do [nothing at end](#). [Play Lists](#) unused. [Amplifier Enabled](#). The [Animation 'Virtual' MCU Triggers](#) which are used to trigger SoundFiles from the Show Control data is entirely unused (all bits set to 'Unused').

The '[¼ J6' Trigger Inputs](#) set as following:

- a) If there are Zero SoundFiles in the Sounds folder, the '[¼ J6' Trigger Inputs](#) is set as follows:
The '[¼ J6' Trigger Inputs](#) are unused. All bits set to 'Unused'.
- b) If there are between one and eight SoundFiles in the Sounds folder, the '[¼ J6' Trigger Inputs](#) is set for 'Direct Selection' of the SoundFiles: Bit #0=SoundFile 1, bit #1=SoundFile 2, bit #2=SoundFile 3, bit #3=SoundFile 4, bit #4=SoundFile 5, bit #5=SoundFile 6, bit #6=SoundFile 7, bit #7=SoundFile 8.
 - b.1) If seven or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #7 becomes 'Stop Now'.
 - b.2) If six or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #6 becomes full mute in one second on closing, and unmute in one second upon opening.
 - b.3) If five or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #5 becomes half mute in one second on closing, and unmute in one second upon opening.
 - b.4) If four or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #4 becomes unmute in one second on closing.
 - b.5) If three or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #3 becomes mute in one second on closing.
 - b.6) If two or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #2 becomes half mute in one second on closing.
- c) If there are nine or more SoundFiles in the Sounds folder, the '[¼ J6' Trigger Inputs](#) is set for binary selection of the SoundFiles: Bits 0-? are used to binary address the available SoundFiles.

- c.1) If 127 or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #7 becomes 'Stop Now'.
- c.2) If 63 or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #6 becomes full mute in one second on closing, and unmute in one second upon opening.
- c.3) If 31 or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #5 becomes half mute in one second on closing, and unmute in one second upon opening.
- c.4) If 15 or less SoundFiles are found, then the '[¼ J6' Trigger Inputs](#) bit #4 becomes unmute in one second on closing.

Sd-50/8 Defaults

Serial address to 00h, First animation output at 00h, MPU triggers at 01h, Volume left @ 02h (but disabled), Volume right @ 03h (but disabled), DMX Rx Enabled, Flash enabled, DMX Checksum Enabled, DST rules set for the US standards (as of 2007), First ServoMotor @ 02h (but disabled), RTC input set for GPS, time zone set to -8:00, All '[¼ J6' Trigger Inputs](#) is entirely unused (all bits set to 'Unused').

The [Animation 'Virtual' MCU Triggers](#) which are used to trigger SoundFiles from the Show Control data is set as follows:

- a) If there are Zero SoundFiles in the Sounds folder:
The [Animation 'Virtual' MCU Triggers](#) are unused. All bits set to 'Unused'.
- b) If there are between one and eight SoundFiles in the Sounds folder, the [Animation 'Virtual' MCU Triggers](#) are set for 'Direct Selection' of the SoundFiles: Bit #0=SoundFile 1, bit #1=SoundFile 2, bit #2=SoundFile 3, bit #3=SoundFile 4, bit #4=SoundFile 5, bit #5=SoundFile 6, bit #6=SoundFile 7, bit #7=SoundFile 8.
 - b.1) If seven or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #7 becomes 'Stop Now'.
 - b.2) If six or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #6 becomes full mute in one second on closing, and unmute in one second upon opening.
 - b.3) If five or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #5 becomes half mute in one second on closing, and unmute in one second upon opening.
 - b.4) If four or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #4 becomes unmute in one second on closing.
 - b.5) If three or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #3 becomes mute in one second on closing.
 - b.6) If two or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #2 becomes half mute in one second on closing.
- c) If there are nine or more SoundFiles in the Sounds folder, the [Animation 'Virtual' MCU Triggers](#) are set for binary selection of the SoundFiles: Bits 0-? are used to binary address the available SoundFiles.
 - c.1) If 127 or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #7 becomes 'Stop Now'.
 - c.2) If 63 or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #6 becomes full mute in one second on closing, and unmute in one second upon opening.

- c.3) If 31 or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #5 becomes half mute in one second on closing, and unmute in one second upon opening.
- c.4) If 15 or less SoundFiles are found, then the [Animation 'Virtual' MCU Trigger](#) bit #4 becomes unmute in one second on closing.

Sd-50/40 Defaults

All settings the same as the **Sd-50/8**, except

MPU triggers addressed at 05h, Volume left @ 06h (but disabled), Volume right @ 07h (but disabled), First ServoMotor @ 06h (but disabled).

What You Should And Shouldn't See

Any **Sd-50/xx** should be booted and begin counting sounds within five seconds. If it takes longer than this, it is an indication that it is having a problem reading the files from the Sd card.

The time it takes to count the sounds once it starts is dependent on the number of sounds that are loaded, the speed of your Sd card, and the length of the sound FileNames. Names which are over 8.3 characters long will take longer to read, as their names span across multiple directory entries (that's a DOS/Windows thing). Shorter names (8.3 characters or shorter) are faster to access and count.

The normal boot sequence for an **Sd-50/xx**:

- 1) The 'Sd access' LED will be on at power up, as the audio processor has yet to be initialized. The next three steps are done by the MCU, while it holds the audio processor in reset.
- 2) Within five seconds, you should see the 'Sd access' LED turn off and the 'DMX' and 'Sd access' LEDs flash as the '**Sd-50.cfg**' file is read from the Sd flash card. If the '**Sd-50.cfg**' file has changed (different time or date), then it will be loaded in its entirety. If it is the same as the last time the unit booted, then it will load the audio portion of the configuration, but use the existing animation configuration. This is what allows you to make minor changes in the configuration through the [serial menus](#), and have them 'stick' until the '**Sd-50.cfg**' file changes.
- 3) If the AutoDownload (.a00), schedule, or GPS files are different from what has already been loaded into the **Sd-50/xx's** internal flash memory (different name, date or time), these files will be read from the Sd flash card into the units internal flash. While it is doing an upload, you will see an alternating flash on the 'heart' and 'DMX' LEDs and a slower pulsing on the 'Show Run' LED.
- 4) If there is a firmware file on the Sd flash card which is more up-to-date than the firmware that is already in the **Sd-50/xx**, it will be used to reprogram the microcontroller inside the unit. While it is doing an update, you will see a very fast alternating flash on the 'heart' and 'DMX' LEDs.
- 5) The audio processor is now started.
- 6) If you have the serial port connected to your computer and GilderTerm running, you will see the copyright notice displayed.
- 7) The sound files that are on the Sd flash card are read by the audio processor. The MCU compares the names of the files with the order of the sounds that you have configured in the '**SdConfig.exe**' program. It sorts them as needed internally to assure that they are played in the order you requested. You will see the 'Sd access' LED flash as it reads each SoundFileName from the Sd flash card. If you have the serial port connected to your computer and GilderTerm running, you will see it print the SoundFileNames on the screen as it enumerates them.
- 8) If set to start a SoundFile at power up, it will now do so.
- 9) If set to start a Show at power up, it will now do so.

If you are operating without an Sd flash card installed in the **Sd-50/8** or **Sd-50/40**, it will skip over the first five steps, and start with step six as shown above. The 'Sd access' LED will be lit in this mode, as the audio processor is never started.

If the Sd flash card is inserted into the **Sd-50/xx**, but it finds it completely unreadable, the 'heart' and 'error' LEDs will flash alternately for about ten seconds as it tries to read the card. The **Sd-50/xx** will load the default triggers and configuration for the audio portion of the configuration, but use the existing animation configuration. This allows you to make minor changes in the configuration through the [serial menus](#),

and have them 'stick' until it finds a 'different' '**Sd-50.cfg**' file. After this, the player will jump into step number six shown above.

If the **Sd-50/xx** finds the Sd flash card, but the MCU has a problem reading the configuration, show, schedule and GPS files, there will be a delay of approximately ten seconds while it chews on them. If at the end of the ten seconds it is still unsuccessful, the **Sd-50/xx** will load the default triggers and configuration for the audio portion of the configuration, but use the existing animation configuration. This allows you to make minor changes in the configuration through the [serial menus](#), and have them 'stick' until it finds a 'different' '**Sd-50.cfg**' file. After this, the player will jump into step number six shown above.

Shows Capacities for Sd-50/8s and Sd-50/40s

This section gives some hints for setting up the shows that will be used by the Show Control side of an **Sd-50/8** or **Sd-50/40**. There are literally thousands of possible configuration arrangements. Most applications will use one of the following configurations.

The 'Stock' memory capacity of an **Sd-50/8** or **Sd-50/40** is 4 MBytes. This is actually just shy of 4.2 million bytes of storage. A small amount of space is used for directories, schedules, GPS files, etc.. The GPS and Schedule files are usually fairly small, and don't occupy much space in the flash memory.

When you save an AutoDownload file for storing on an **Sd-50/8** or **Sd-50/40**, PC•MACs will calculate exactly how much space this file will require and save this in the '.set' file. If you need to 'ballpark' how big your show is going to be, the formula to calculate the capacity of the memory is:

$$\text{(Number of Channels x frame rate) x length of shows}^1 = \text{length in bytes}$$

The 'Number of Channels' is how many eight bit bytes of storage each frame of data will need. Eight digital (on/off) functions fit within one eight bit channel. If even just one digital output is used in an eight bit channel, the entire byte will need to be stored. Analog functions are typically eight bits in 'resolution' and occupy a single eight bit channel. There are exceptions to this, and analog functions can be created that occupy twelve bits, sixteen bits, twenty-four or thirty-two bits as well. These will occupy 1.5, two, three or four bytes of storage per frame. Resolutions above sixteen bits are not often (i.e.: never) used.

The 'Frame Rate' is typically 30 frames (updates) per second (30 FPS) in the US (where video runs at about 30 FPS). In countries where video runs at 25 FPS, it is not uncommon to use 25 FPS for shows. Fountains and slow moving digital animatronic shows don't usually benefit from faster update rates, so you can program them at a lower rate (like 15 FPS) if you need the show capacity. This will effectively double the show capacity of an **Sd-50/8** or **Sd-50/40**.

The **Sd-50/8** or **Sd-50/40** allow you to mix shows with different frame rates in the same AutoDownload file. You can make 'delay' shows that tick along at one or two FPS between the main shows that may run at 15 or 30 FPS.

In an **Sd-50/8**, you will typically use one eight bit channel for the eight Show Control outputs, and one eight bit channel for the [Animation 'Virtual' MCU Trigger](#) channel. At 30 FPS, this will use 60 bytes each second. With 4,100,000 bytes of storage (approximately), this means that the capacity under these conditions will be (approximately) 68,333 seconds. Divide this by 60 (the number of seconds in an average minute) and the capacity is shown to be 1139 minutes. Divide by 60 again (number of minutes in an average hour) and it shows the capacity is (approximately) 19 hours.

In an **Sd-50/40**, you will typically use five eight bit channel for the forty Show Control outputs, and one eight bit channel for the [Animation 'Virtual' MCU Trigger](#) channel. At 30 FPS, this will use 180 bytes each second. With 4,100,000 bytes of storage (approximately), this means that the capacity under these conditions will be (approximately) 22,778 seconds. Divide this by 60 (the number of seconds in an average minute) and the capacity is shown to be 380 minutes. Divide by 60 again (number of minutes in an average hour) and it shows the capacity is (approximately) 6.3 hours.

Things start getting more complicated when you start adding in additional control channels. Additional channels can be needed for controlling ServoMotors (as many as eight), real time control of the left or right audio volume (one or two channels), and DMX-512 channels for controlling dimmers, wiggle lights, strobes, LED light fixtures, smog machines, etc. (there can be as many as 512 of these!).

The 'Show Capacities' shown are at 30 frames (updates) per second, with a memory of 4.1 million bytes available (allowing about 100K for directories, schedules, GPS files, etc.). If you will be using 15 FPS, you can simply double the times shown. The typical capacities of **Sd-50/8** and **Sd-50/40** (if using only the onboard Show Control

¹ Length of show is in seconds

Outputs and [Animation 'Virtual' MCU Trigger](#) channel) are shown in **bold**. The last three columns show the capacity with the optional 'extended' show memory.

Number of Eight Bit Channels needed	Number of Bytes needed per Sec. (@ 30 FPS)	Standard Show Capacity (Seconds)	Standard Show Capacity (Minutes)	Standard Show Capacity (Hours)	Extended Memory Capacity (Seconds)	Extended Memory Capacity (Minutes)	Extended Memory Capacity (Hours)	
1	30	136,667	2,278	38.0	276,667	4,611	76.9	
2	60	68,333	1,139	19.0	138,333	2,306	38.4	← Sd-50/8
3	90	45,556	759	12.7	92,222	1,537	25.6	
4	120	34,167	569	9.5	69,167	1,153	19.2	
5	150	27,333	456	7.6	55,333	922	15.4	
6	180	22,778	380	6.3	46,111	769	12.8	← Sd-50/40
7	210	19,524	325	5.4	39,524	659	11.0	
8	240	17,083	285	4.7	34,583	576	9.6	
9	270	15,185	253	4.2	30,741	512	8.5	
10	300	13,667	228	3.8	27,667	461	7.7	
11	330	12,424	207	3.5	25,152	419	7.0	
12	360	11,389	190	3.2	23,056	384	6.4	
13	390	10,513	175	2.9	21,282	355	5.9	
14	420	9,762	163	2.7	19,762	329	5.5	
15	450	9,111	152	2.5	18,444	307	5.1	
16	480	8,542	142	2.4	17,292	288	4.8	
24	720	5,694	95	1.6	11,528	192	3.2	
32	960	4,271	71	1.2	8,646	144	2.4	
40	1,200	3,417	57	0.95	6,917	115	1.92	
48	1,440	2,847	47	0.79	5,764	96	1.60	
56	1,680	2,440	41	0.68	4,940	82	1.37	
64	1,920	2,135	36	0.59	4,323	72	1.20	
80	2,400	1,708	28	0.47	3,458	58	0.96	
96	2,880	1,424	24	0.40	2,882	48	0.80	
112	3,360	1,220	20	0.34	2,470	41	0.69	
128	3,840	1,068	18	0.30	2,161	36	0.60	
144	4,320	949	16	0.26	1,921	32	0.53	
160	4,800	854	14	0.24	1,729	29	0.48	
176	5,280	777	13	0.22	1,572	26	0.44	
192	5,760	712	12	0.20	1,441	24	0.40	
208	6,240	657	11	0.18	1,330	22	0.37	
224	6,720	610	10	0.17	1,235	21	0.34	
240	7,200	569	9.5	0.16	1,153	19.2	0.32	
256	7,680	534	8.9	0.15	1,081	18.0	0.30	
320	9,600	427	7.1	0.12	865	14.4	0.24	
384	11,520	356	5.9	0.10	720	12.0	0.20	
448	13,440	305	5.1	0.08	618	10.3	0.17	
512	15,360	267	4.4	0.07	540	9.0	0.15	

As you can see in the preceding chart, although you can download as many as 512 channels worth of data, when you get that many channels on an **Sd-50/8** or **Sd-50/40**, you can very quickly burn through the standard on-board flash memory. If loading up all 512 possible channels, it will hold only 4.4 minutes worth of show data!

If you find yourself in this situation, it is standard to use a second card that is made just to hold massive amounts of DMX-512 data. The **Br-Brain4** is designed to control as many as 2048 channels (four full DMX-512 universes). The **Br-Brain4** can hold days worth of data, even when loaded to the full 2048 channel capacity.

What To Do With A New Sd Flash Card

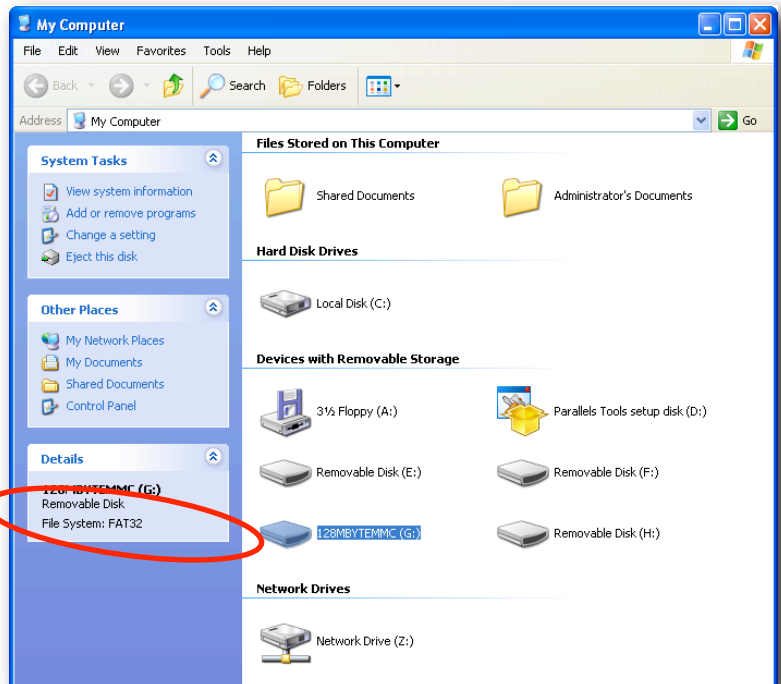
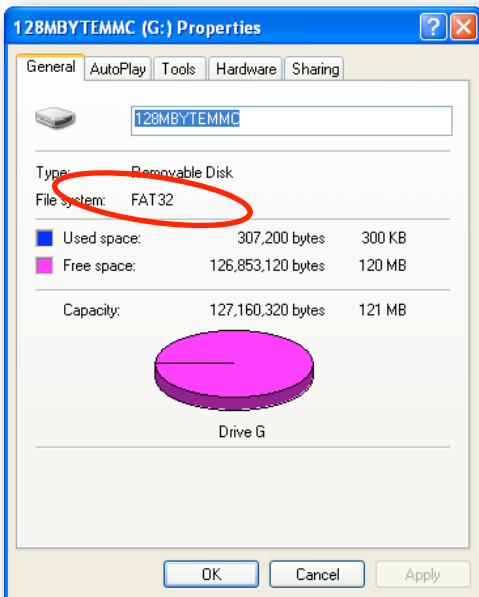
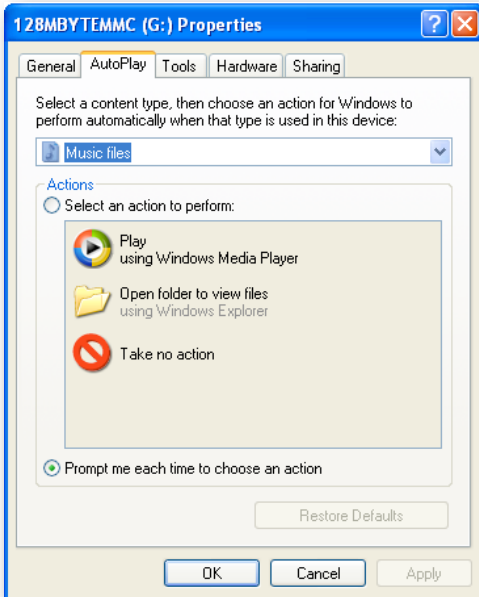
Larger Sd flash cards only rarely need any preparation before they can be used with the **Sd-50/xx**. They are normally shipped formatted 'FAT32', which is ready to use with the **Sd-50/xx**. Smaller cards may need reformatting to load them with the 'FAT32' file system.

The **Sd-50/xx** will not be able to read the **SD-50.cfg** or AutoDownload files from the card if it is improperly formatted.

You can recognize this when a **Sd-50/xx** boots. Normally you can see a few blinks on the front of the player as it reads these files a few seconds after it boots. If there is a long delay before the player does anything, then the card is likely formatted improperly.

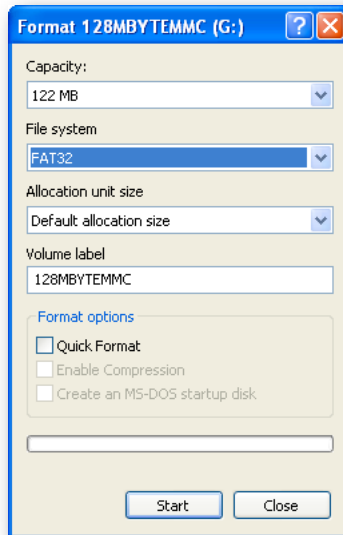
To format an Sd flash card, plug it into the appropriate slot on your computer (or an adapter, attached to your computer's USB port). After a few moments, an hourglass should appear once or twice while Windows digests this addition. Windows may open a dialog to ask you what you want to do with this disk (browse it, play sounds, etc.) or open a window to do what you had selected previously (browse it, play sounds, etc.). In either case, close the dialog or window.

We just need to check the format of this card. This can be checked in the 'My Computer' window (then select the removable Sd flash card, which in this example is drive 'G'), or by 'left'+clicking on the removable Sd flash card and getting the 'properties' for it:



If the card is already formatted 'FAT32', then we don't need to reformat it. You can just drag-n-drop your sound and show files on it.

If the Sd flash card is NOT already formatted in 'FAT32', then it needs reformatting before it can be used. You can select the Sd flash card from the 'My Computer' window, and either choose 'Format' from the 'File' pulldown, by 'left'+clicking on the removable Sd flash card and selecting 'Format'. In either case, it brings up the following dialog:



The files system for Sd flash cards should be 'FAT32'. You can uncheck 'quick format' to do a full format if you want to be sure that the Sd flash card is completely reformatted. If the drive capacity is not what you think it should be, then you *should* do a full format on the Sd flash card. You can rename the Sd flash card ('Volume label') as desired before you start the formatting process.

Press 'Start' to format your Sd flash card, or cancel if you don't want to. All data which is on the Sd flash card will be erased.

Locking Your Data

The Secure Digital flash cards used on the **Sd-50/0**, **Sd-50/8** or **Sd-50/40** feature a small switch on their side which discourage changing files on the flash card. This switch does not physically protect the data on the flash card, but does dissuade most card reader/writers from writing when the switch is in the 'locked' position. The **Sd-50/0**, **Sd-50/8** or **Sd-50/40** players themselves never write to the Sd flash card. They don't even contain the software needed to write to an Sd flash card.

A locked Sd card is indicated on the ['status' report](#) or [main menu](#) of the **Sd-50/0**, **Sd-50/8** or **Sd-50/40**. The work 'locked' will appear at the end of the line that tells about the sound files that are loaded on the Sd card.

MultiMedia Cards (MMC) do not have the write protect switches on them, and cannot be 'locked'.

The internal flash memory on the **Sd-50/0**, **Sd-50/8** or **Sd-50/40** can also be protected against changes. When 'locked', the show files, schedule and GPS files can not be erased or changed.

There are two ways to protect the onboard flash memory on an **Sd-50/0**, **Sd-50/8** or **Sd-50/40**:

- 1) When a Secure Digital (Sd) card is inserted in an **Sd-50/0**, **Sd-50/8** or **Sd-50/40**, it checks the condition of the 'lock' switch. If the Sd flash card is locked, then the internal flash memory on the an **Sd-50/0**, **Sd-50/8** or **Sd-50/40** is locked as well. When this switch is in the locked position, you will see this indicated on the ['status' report](#) or [main menu](#) of the **Sd-50/0**, **Sd-50/8** or **Sd-50/40**. The work 'locked' will appear after the size of the flash memory is displayed, and at the end of the line that tells about the sound files that are loaded on the Sd card.
- 2) The onboard flash memory of an **Sd-50/0**, **Sd-50/8** or **Sd-50/40** can also be protected against changes by checking the ['Write Protect Flash Memory'](#) checkbox on the ['Animation Control Setup'](#) tab in the **'SdConfig.exe'** program. This will not affect the Sd flash card that is inserted in the **Sd-50/0**, **Sd-50/8** or **Sd-50/40**. The work 'locked' will appear after the size of the flash memory is displayed, but not on the 'sound' line.

Both write protection features can be engaged at the same time. To enable writing to the onboard flash memory, both will need to be set back to the 'writable', unlocked conditions.

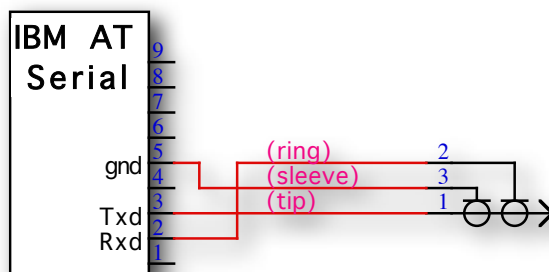
Sd-50/0, Sd-50/8 or Sd-50/40 Serial Commands

The **Sd-50/xx** can be accessed through the RS-232 serial port from any computer running just about any modem or terminal program. The computer you are using doesn't even need to have any Gilderfluke & Co. software installed on it.

Most Gilderfluke & Company products can be controlled through their RS-422 Serial ports. Up to 256 different cards and devices can be attached to the same serial lines, to form a complete RS-422 'multi Drop' network. Anywhere on this network you can attach operator panels to access and control it, or you can use a telephone or Internet modem so that it can be accessed from around the block or around the world. Commands can be addressed to a single card on the network, or all the cards simultaneously. The wire used in a RS-422 network can be run up to a mile, and extended even further by using devices known as 'repeaters'.

Gilderfluke & Company products that use RS-232 serial ports work in much the same way as the ones which use RS-422 serial ports. The commands and features are the same. The difference is that the RS-232 standard limits you to a single device attached to each serial port at one time, and limits the wire runs to under fifty feet.

The RS-232 serial data signals from the **Sd-50/xx's** are brought out on a 1/8" three conductor 'stereo' socket. Its pin out and cross connect to the standard serial port on a PC is as follows:



The mnemonic for remembering the connections are: Ring = Receive, and Tip = Transmit.

The **Sd-50/xx** use RS-232 ports on their fronts, which share these limitations, and RS-422 (receive-only) ports on the rear which can be used as part of a multidrop serial network.

Touch screen operator panels are one of the easiest and most flexible types of operator interfaces available for accessing the serial network. These are available from a number of different suppliers, and most of them will easily attach right to our serial network. Most of these allow you to 'draw' whatever buttons and user interface icons on their screens (using a provided Windows program), attach ASCII strings to these 'buttons', and then download the final configuration to the operator panel so the PC can be taken away.

Typical modem programs you can use are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes later versions of Windows), or GilderTerm.

GilderTerm is available free from Gilderfluke & Co. for use with all our products. It can be downloaded from our web page, and is included on all our CD-ROMs. GilderTerm has been optimized for use with all Gilderfluke & Company equipment. All the commands are built in, and it will even let you use your mouse to select commands by simply clicking on them.

To use the **Sd-50/xx** with a terminal program, just configure it for 9600 baud, no parity, eight data bits, one stop bit and 'xon/xoff' handshaking. If you are using GilderTerm, all the settings are fixed at the appropriate settings. All you will need to do is select the appropriate 'COM' port.

The **Sd-50/xx** is normally accessed through its RS-232 serial port. A configuration option available through the '**SdConfig.exe**' program takes over the DMX-512/MIDI serial port to use it as a RS-422 receive-only serial port. This is called '**Net Serial**' mode. Selection this option disables [DMX-512 in](#), [MIDI in](#), and [IR Trigger in](#). Up to 256 different cards and devices can be attached to the same serial lines, to form a RS-422 'multi Drop' network. You can attach operator panels anywhere on this network to access and control it, or you can use a telephone or Internet modem so that it can be accessed

from around the block or around the world. Commands can be addressed to a single card on the network, or all the cards simultaneously. When in 'Net Serial' mode, any serial responses from the **Sd-50/xx** will be sent out through the normal RS-232 serial port. You will not get responses on the DMX-512 out terminals.

1) Echo Commands:

Echo On: "a" [nn] (card address)

Echo Off: "b"

The 'Echo ON' command will turn on a special mode that will cause all serial port commands to echo on the selected card. This used when you are setting up serial commands so you can verify all the commands you are issuing are being received correctly (the 'echo' responses are shown in *italics*):

If you send "a00", the echo mode will be turned ON:

card 00h/__0, echo mode on

If you send "*03" to request a specific show:

card 00h/__0, requested show 03h/__3 CHEEBURG

If you send "t00" to start the requested show playing on a specific card:

card 00h/__0, starting show 03h/__3 CHEEBURG

If you send "l00" to start a show looping on a specific card:

card 00h/__0, looping show 04h/__4 FRUTCAKE

If you send "u" to stop a show playing:

card 00h/__0, stopped show 05h/__5 IGETARND

If you send "u" to stop a card that is already stopped, it will give you an error message:

card 00h/__0, error: not playing or looping 05h/__5 IGETARND

Similar error messages will be returned whenever you ask the card to do something that it can not do at the current time.

The 'Echo OFF' command will turn off the echo mode on all the cards in the system.

2) Card Status: "i" [nn] (card address)

The following shows an **Sd-50/xx** information status response:

```
-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
Card at 00h/__0 | DMX-512 w/258 /CS data Rxd | flash: 4 MBytes (locked)
1/4 J6 in: 00000000b | MCU in: 00000000b
A/Green: Open | B/Red: Open | C/Blue: Open | D/White: Open | RTC: GPS
set: CRoom1__a00 | # of shows: __10 | # of channels: 236 | @ offset: __0
show: __10 CR1_Loff.sho looping @ frame _____29
GPS time: dst 01:23:45 Sunday January 01, 2007 sch: Sundays in May
GPS: 34°10'35.94"N 118°18'40.17"W alt:171m spd:12.3k hdg:123° sats:8 hdop:0.9m
sound: __15 SoundFiles playing #__0 FileName.MP3 @ 12345 sec. vol: 255/255
```

Status Screen: (Sample data: Your show data will differ from what is shown.)

The status screen is a snapshot image of the current status of the **Sd-50/xx**. If you want to update the status information displayed, you must hit the 'Card Status' command a second time.

When the **Sd-50/xx** receives this command, it will respond with the following information:

- 1) Header Information:
 - a) Gilderfluke & Company
 - b) product name
 - c) Firmware revision number
 - d) copyright.
- 2) Serial Port Information:
 - a) Card serial address
 - b) [DMX-512](#), [MIDI in](#) or [Net Serial](#) data is being received through the secondary serial port.
 - i) If receiving DMX, if the packets are 258 bytes in length
 - ii) If receiving DMX, if the packets are expected to contain a GilderChecksum
 - c) the amount of onboard flash memory installed
 - d) if the onboard flash memory has been locked or is writable.
- 3) The current status of:
 - a) [¼ J6](#) input
 - b) [Animation 'Virtual' MCU Trigger](#) port that is used to trigger audio from animation data
- 4) The current status of the five optically isolated inputs. Each input will show whether it is 'opened' (no current flowing) or 'closed' (current flowing through the input).
- 5) AutoDownload 'Set' information.
 - a) Name of the AutoDownload File (in DOS 8.3 format).
 - b) Number of shows in AutoDownload file.
 - c) Number of channels in AutoDownload file.
 - d) Offset to first channel stored in AutoDownload file.
- 6) Information on the currently loaded show.
 - a) Name of the Show (in DOS 8.3 format).
 - b) Status of the show:
 - i) Stopped
 - ii) Playing (at the end of the show it will stop)
 - iii) Looping (at the end of the show, it may or may not play another show. A message will be displayed if it has been set to do nothing at the end of this show.
 - iv) Paused. Playing or Looping, but it has been paused.
 - c) Frame number that the show is at.
- 7) RTC or GPS time.
 - a) If Daylight Savings Time is in effect, it will display 'dst', or 'sdst' if in the southern hemisphere.
 - b) Time
 - c) Day of Week
 - d) Date

- e) Schedule being used, or 'none loaded' if no schedule file has been found, or 'none today' if there is a schedule being used on this day. Note that the schedule being used is only updated on even minutes, as the schedule is scanned.
- 8) GPS data.
- a) Latitude
 - b) Longitude
 - c) Elevation
 - d) Speed
 - e) Heading
 - f) Number of satellites being received
 - g) Horizontal Dissolution of Precision: This is an indication of the relative accuracy of the signal being received. The more satellites being used, the greater the accuracy of the received signal.
- 9) Information on the currently loaded SoundFiles.
- a) Name of the Show (in DOS 8.3 format).
 - b) Status of the Sound playback:
 - i) Stopped
 - ii) Playing (at the end of the SoundFile it may or may not play another sound file).
 - iii) Looping. At the end of the sound, it will loop the same SoundFile as seamlessly as possible.
 - iv) Paused. Playing or Looping, but it has been paused.
 - c) Name of the SoundFile (in DOS 8.3 format).
 - d) Seconds into the SoundFile.
 - e) Volume of the left and right sides of the repeater output. A value of 255 is at maximum. It displays 'muted' when not playing.

3) **Card Reset: "j5AA5" [nn] (card address)**

This command will erase the 'Flash' memory on the **Sd-50/xx**. It erases any show, Calendar and GPS data files. Whatever is stored on the Sd flash card is unaffected.

4) **Start Commands**

Start Track: "t" [nn] (card address)

Start Global: "u"

These commands start the animation playing on the **Sd-50/8(s)** or **Sd-50/40(s)** addressed by the command. The shows will always start from the beginning. If an addressed **Sd-50/8** or **Sd-50/40** is looping shows, it will have the '**LOOPING SHOWS**' flag reset.

If the **Sd-50/8** or **Sd-50/40** receives a start command after it has received a request for a specific show, it will play that show. Otherwise, it will play the show that has been set as the 'next' show for the show which is currently playing (or most recently played show if it is not currently playing). If this is the first show

played after an **Sd-50/8** or **Sd-50/40** is reset, it will play the show which has been set as the 'first' show during the AutoDownload. Requests for specific shows can come only from the serial port.

When shows are downloaded to the **Sd-50/8** or **Sd-50/40**, they can be set to ignore additional start commands while they are playing. This allows individual shows to be 'stepped' upon or not. If the **Sd-50/8** or **Sd-50/40** is already playing a show which has this option set, it will ignore this command.

5) Stop Commands

Stop Track: "x" [nn] (card address)

Stop Global: "y"

These commands stop the selected **Sd-50/8(s)** or **Sd-50/40(s)** unconditionally. The stop takes place at the current frame being played.

6) Loop Commands

Loop Track: "!" [nn] (card address)

Loop Global: ""

These command acts much like the **START** commands, except that they also set the '**LOOPING SHOWS**' flag. With this flag set, it is possible to set a sequence of shows playing in any order. Since the 'next' show can be any show you ask for, one show can be played over and over again, or you can set up a sequence of shows which will be repeated until the **Sd-50/8** or **Sd-50/40** is told to stop.

7) Stop at End Commands

Stop at End Track: "%" [nn] (card address)

Stop at End Global: "&"

These commands reset the '**LOOPING SHOWS**' flag in the selected **Sd-50/8** or **Sd-50/40** (s). What this does is to stop them playing when the end of the current show is reached. These commands are used when you want the shows to finish gracefully. The **STOP** commands are used when you want to stop a show immediately.

8) Select Show Commands

Select Show Track: ")" [nn] (Card Address) [nn] (show#)

Select Show Global: "*" [nn] (show#)

Up to two hundred fifty-five different animated shows can be stored on a single **Sd-50/8** or **Sd-50/40**. These commands can be used to select an individual show on the selected **Sd-50/8** or **Sd-50/40** (s). Indi-

vidual shows can be requested with a range of 01 to FFH. Once a show is selected, it will be played on the next serial port **START** or **LOOP** command.

If a show selection has been made inadvertently, it can be cleared by sending a request for show number 00.

A special mode is available with this command for users who just need to trigger audio files through the serial port. If NO shows are loaded onto the **Sd-50/8** or **Sd-50/40**, This command will start the selected audio track immediately. No additional 'start' or 'play' commands are needed to start the sounds playing.

9) Select & Play Sound Commands

Select Sound Track: “^t” [nn] (Card Address) [nn] (sound#)

Select Sound Global: “^u” [nn] (sound#)

Up to two hundred fifty-five different sounds can be stored on a single **Sd-50/xx**. These commands can be used to select an individual sound on the selected **Sd-50/0(s)**, **Sd-50/8(s)** or **Sd-50/40(s)**. Individual sounds can be requested with a range of 01 to FFH. Once a sound is selected, it will be played immediately. The sound number must be entered as a two digit hexadecimal number.

To type these commands from the keyboard of your computer, hold down the <control> key before typing the character 't' or 'u', then enter the card address [nn] (usually '00') (address is not needed for the 'global' command), and the desired SoundFile in hex ('00' to 'FF').

10) Volume Command: “^v” [nn] (Card Address) [vv] (Volume)

This command is used to control the level of the audio output through the serial port. Volume control from the [DMX-512](#) data must be enabled in the '[SdConfig.exe](#)' program for this command to have any effect. The assigned DMX-512 channels will only have an effect until this command is received for the first time. After that, the DMX-512 channel will be ignored. Both the left and right outputs are set to the same volume levels.

To type this command form the keyboard of your computer, hold down the <control> key before typing the character 'v', then enter the card address [nn] (usually '00'), and the desired volume in hex ('00' to 'FF').

11) Show Pause Commands

Pause Show: “<” [nn] (card address)

Continue Show: “>” [nn] (card address)

Any show and audio can be paused at any point during its playback. The outputs are frozen at the levels they were at the instant the **PAUSE** command is received.

The **CONTINUE** command will resume any show playing which has previously been **PAUSED**.

Repeated pausing and un-pausing of the show and sound can cause the audio and show playback to drift apart. Overuse of these commands should be avoided if this is important to your application.

12) AutoDownload: “sA5A5” [nn] (card address)

This is the format of the file that the **Sd-50/8** or **Sd-50/40** will receive and load into its 'Flash' memory.

An AutoDownload file is a binary file. Any AutoDownload file that has previously been saved can be sent to an **Sd-50/8** or **Sd-50/40** by selecting the 'send binary file' on your modem program and selecting the AutoDownload file for sending. You must be sure that the modem program has not been set to 'gobble' any special characters (carriage returns, line feeds, etc.).

The Hyper Terminal program that comes with recent versions of Windows will not work for sending AutoDownloads. For some strange reason it has been written to randomly change any binary value that is larger than one hundred twenty-seven.

If you AutoDownload shows to an **Sd-50/8** or **Sd-50/40**, the shows will stay in the flash memory as long as a different (different AutoDownload FileName, or different date/time on an AutoDownload file with the same FileName) AutoDownload file is not found on the Sd flash card.

13) RealTime Update: “~”

This command sets the **Sd-50/8** or **Sd-50/40** into a mode where it will update the outputs in RealTime from the data received through the serial port. The **Sd-50/8** or **Sd-50/40** uses this command to update the outputs in real time.

The maximum frame rate supported by this function is thirty frames per second. Any faster than this just won't fit through the PC's serial port at the 9600 baud used.

Serial Command Summary

Echo Commands:

Echo On: "a" [nn] (card address)
Echo Off: "b"

Card Status: "i" [nn] (card address)

Card Reset: "j5AA5" [nn] (card address)

Start Commands:

Start Track: "t" [nn] (card address)
Start Global: "u"

Stop Commands:

Stop Track: "x" [nn] (card address)
Stop Global: "y"

Loop Commands:

Loop Track: "!" [nn] (card address)
Loop Global: "!"

Stop at End Commands:

Stop at End Track: "%" [nn] (card address)
Stop at End Global: "&"

Select Show Commands:

Select Show Track: ")" [nn] (Card Address) [nn] (show#)
Select Show Global: "*" [nn] (show#)

Select & Play Sound Commands:

Select Sound Track: "At" [nn] (Card Address) [nn] (sound#)
Select Sound Global: "Au" [nn] (sound#)

Volume Command: "Av" [nn] (Card Address) [vv] (Volume)

Show Pause Commands:

Pause Show: "<" [nn] (card address)
Continue Show: ">" [nn] (card address)

AutoDownload: "sA5A5" [nn] (card address)

RealTime Update: "~"

Sd-50/0, Sd-50/8 or Sd-50/40 Hardware Config.

Just about all the **Sd-50/8** or **Sd-50/40** configuration is done using the '**SdConfig.exe**' program, Serial port using GilderTerm, or during the AutoDownload of the shows from **PC•MACs**. The only hardware configuration options are:

1) '[¼ J6](#)' Internal/External Power

This switch (located on the bottom of the **Sd-50/xx**) is used to switch the power from the '[¼ J6](#)' connector between an internal source, and an external source that must be fed from outside the **Sd-50/xx**. For an **Sd-50/0**, this is the trigger input to the **.Mp3/wav player**, and either position can be used as determined by your application. For the **Sd-50/xx**, this is also the first or last Show Control output channel. Only the 'Internal' position should be used.

2) RS-422/Optoisolated

This switch (located on the bottom of the **Sd-50/8** or **Sd-50/40**) is used to switch the [DMX-512/MIDI serial port](#) between using RS-422 input signal levels to an optoisolated current loop. If receiving [DMX-512](#), you must use the 'RS-422' setting. For [MIDI in](#), you must use the 'optoisolated' position. For [Net Serial](#) or [IR Trigger modes](#), you can use either position, but 'RS-422' is normally used unless you need to optically isolate the input.

3) Right Volume Control

4) Left Volume Control

These two potentiometers (located on the front of the **Sd-50/xx**) are used to adjust the audio level for the two outputs from the **Sd-50/xx**. They control both the line level outputs, and the on board amplifier's output levels.

The volume control pots on the front of the **Sd-50/xx's** are downstream of the [electronic volume limits](#) set inside the '**SdConfig.exe**' program. This allows the volume to be adjusted to anywhere BELOW the limit set in the '**SdConfig.exe**' program.

In most applications, you will use the [electronic volume limits](#) set inside the '**SdConfig.exe**' program to set the **MAXIMUM** possible output from the **Sd-50/xx's**. This should be set to a level which is loud, but not so loud that it will destroy the speakers and other downstream gear (or listeners).

Use a small 'trimmer' screwdriver to adjust the volume control pots.

The the volume control pots are smaller than you.

Do not use a big screwdriver on them.

Do not apply too much force.

They will break!

Sd-50/0, Sd-50/8 or Sd-50/40 Serial Configuration

Sd-50/xx is normally configured through the '**SdConfig.exe**' program. You can also configure much of the **Sd-50/xx** through the serial port. You will use the serial port configuration commands for:

- 1) For testing purposes. You can start and play shows and sounds to confirm everything is where you expected it to be, and that they play as desired.
- 2) Application which do not need or use an Sd flash card (only the animation part of the **Sd-50/xx** is going to be used).
- 3) Applications with sounds which use the default configuration can be used without having run the '**SdConfig.exe**' program. The Sd flash card used in these applications will not have an **Sd-50.cfg** file on it. This tells the **Sd-50/xx** to 'load defaults' for the sound playback configuration. SoundFiles are played in 'Windows drag-n-drop' order, the amplifier is enabled, and all the other sound settings are just as though you had run the '**SdConfig.exe**' program and selected the 'reload defaults' command. The animation settings are left as they were before the Sd flash card without the **Sd-50.cfg** file on it.
- 4) Setting the endpoints used for the ServoMotor PWM outputs.

You must be aware that (with one exception) any changes in the configuration made through the serial port configuration commands will only 'stick' until an Sd flash card is inserted with a valid **Sd-50.cfg** file with a different date or time stamp than what was in the **Sd-50/xx** before you changed the configuration. This means that the configuration will 'stick' as long as you use the same Sd flash card that was in the **Sd-50/xx** before you changed the configuration (or a duplicate of it), or you only insert Sd flash cards that have no **Sd-50.cfg** file on them.

The 'one exception' is the only function that **MUST** be configured through the serial port. These are the ServoMotor PWM endpoints. They will 'stick' though everything but a mangled configuration in flash memory. When it finds this, the player will reload all the defaults in the animation control configuration. This should never happen.

The **Sd-50/xx** can be accessed through the RS-232 serial port from any computer running just about any modem or terminal program. The computer you are using doesn't even need to have any **PC•MACs** software installed on it.

Typical modem programs you can use with Gilderfluke & Company equipment are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes with later versions of Windows), or our favorite, **GilderTerm**. **Gilderterm** is also available from within **PC•MACs**.

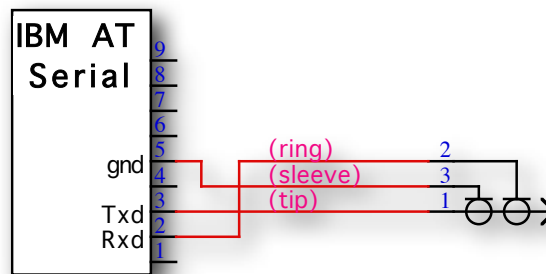
GilderTerm is available free from Gilderfluke & Co. for use with all of our products. It can be downloaded from our web page, and is included on all of our CD-ROMs. **GilderTerm** has been optimized for use with all Gilderfluke & Company equipment. All of the commands are built in, and it will even let you use your mouse to select commands.

To use the **Sd-50/xx** with any other terminal program, just configure your terminal program for 9600 baud, no parity, eight data bits, one stop bit and 'xon/xoff' handshaking. If you are using **GilderTerm**, all the settings are fixed at the appropriate settings. All you will need to do is select the appropriate 'COM' port.

Your terminal emulation program must support VT-52 terminal emulation (they all do!) to use it with the **Sd-50/xx**. You should set your program **NOT** to insert an extra LineFeed (LF) character after each Carriage Return (CR) it receives. You should also tell it **NOT** to scroll automatically after the eightieth column is filled. If either of these are on, the screen will be

displayed 'double spaced'. This won't cause any problem, but will make it hard to see the whole eighty by twenty-four character screen at one time.

The RS-232 serial data signals from the **Sd-50/xx**'s are brought out on a 1/8" three conductor 'stereo' socket. Its pin out and cross connect to the standard serial port on a PC is as follows:



The mnemonic for remembering the connections are: Ring = Receive, and Tip = Transmit.

If you have hooked up the **Sd-50/xx** to your computer and it still doesn't seem to respond to the keyboard, the first thing to check is that you are attached to the right serial port. The easiest way to do this is to disconnect the **Sd-50/xx** and short between the Tx data out and Rx data in pins on the serial port connector on the back of your computer. On all IBMs and compatibles this means sticking a piece of wire, paper clip, or similar tool between pins 2 and 3 on the 'Com.' connector. While still running the modem program, anything you type should be shown on the screen while this paper clip is in place, while nothing will appear when you remove it. If your computer passes this test, then you are using the right serial port and the problem is most likely the baud rate setting or in your wiring to the **Sd-50/xx**. If you get characters on the screen even with the paper clip removed from the serial port, it means you probably need to set the 'echo' mode to 'none' or 'full duplex' and try this test again.

The **Sd-50/xx** is normally accessed through its RS-232 serial port. A configuration option available through the '**SdConfig.exe**' program takes over the [DMX-512/MIDI serial port](#) to use it as a RS-422 receive-only serial port. This is called '[Net Serial](#)' mode. Selection this option disables [DMX-512 in](#), [MIDI in](#), and [IR Trigger Mode](#) in. Up to 256 different cards and devices can be attached to the same serial lines, to form a RS-422 'multi Drop' network. You can attach operator panels anywhere on this network to access and control it, or you can use a telephone or Internet modem so that it can be accessed from around the block or around the world. Commands can be addressed to a single card on the network, or all the cards simultaneously. When in 'Net Serial' mode, any serial responses from the **Sd-50/xx** will be sent out through the normal RS-232 serial port. You will not get responses on the DMX-512 out terminals.

Entering Serial Configuration

To enter the serial configuration mode you need to type the following. The (address) is replaced by the '**Serial Address**' set in the '**SdConfig.exe**' program (normally this is '00'):

m5AA5(Card Address)

If using **GilderTerm**, you simply press the 'Enter Configuration' button. **GilderTerm** will send the string needed to enter configuration for you.

If any other card is in configuration mode (or even if it just thinks another card is in configuration), the **Sd-50/xx** won't be able to enter configuration mode. To exit any other card from configuration type 'XN'. You can then try entering configuration again.

When you enter configuration the **Sd-50/xx** will display the following screen:

```

-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
Card at 00h/___0 | DMX-512 w/258 /CS data Rxd | flash: 4 MBytes (locked)
1/4 J6 in: 00000000b | MCU in: 00000000b
A/Green: Open
B/Red: Open
C/Blue: Open
D/White: Open
GPS: 34°10'35.94"N 118°18'40.17"W alt:171m spd:12.3k hdg:123° sats:8 hdop:0.9m
set: CRoom1___a00 | # of shows: _10 | # of channels: 236 | @ offset: __0
show: _10 CR1_LOff.sho looping @ frame _____29
sound: _15 SoundFiles playing #__0 FileName.MP3 @ 12345 sec. vol: 255/255 locked

GPS time: dst 01:23:45 Sunday January 01, 2007 sch: Sundays in May
d) DST: 02:00 2nd Sunday in March to 02:00 1st Sunday in November

u) adj. | Servo0 | Servo1 | Servo2 | Servo3 | Servo4 | Servo5 | Servo6 | n/a 7
minimum: |1.0000ms|1.0000ms|1.0000ms|1.0000ms|1.0000ms|1.0000ms|1.0000ms|1.0000ms
maximum: |2.0000ms|2.0000ms|2.0000ms|2.0000ms|2.0000ms|2.0000ms|2.0000ms|2.0000ms

a) play a sound      b) stop sound      o) reload defaults  z) time Zone: -08:00
l) Loop show        p) Play show      s) Stop show       e) stop at End
v) Verify shows     i) show Info      m) Config          x) eXit

Command-
    
```

Main Menu: (Sample data: Your show and sound data will differ from what is shown.)

To redraw the screen at any time, just press the <ESC>ape key or <SPACE> bar.

1) Header Information:

- a) Gilderfluke & Company
- b) product name
- c) Firmware revision number
- d) copyright.

3) Serial Port Information:

- a) Card serial address
- b) [DMX-512](#), [MIDI in](#) or [Net Serial](#) data is being received through the secondary serial port.
 - i) If receiving DMX, if the packets are 258 bytes in length
 - ii) If receiving DMX, if the packets are expected to contain a GilderChecksum
- c) the amount of onboard flash memory installed
- d) if the onboard flash memory has been locked or is writable.

4) The current status of:

- a) ['¼ J6'](#) input
- b) [Animation 'Virtual' MCU Trigger](#) port that is used to trigger audio from animation data

5) The current status of the A/Green optically isolated input. Input will show whether it is 'opened' (no current flowing) or 'closed' (current flowing through the input).

6) The current status of the B/Red optically isolated input. Input will show whether it is 'opened' (no current flowing) or 'closed' (current flowing through the input).

7) The current status of the C/Blue optically isolated input. Input will show whether it is 'opened' (no current flowing) or 'closed' (current flowing through the input).

- 8) The current status of the D/White optically isolated input. Input will show whether it is 'opened' (no current flowing) or 'closed' (current flowing through the input).
- If the option to enable/disable the 365 day scheduling features of an **Sd-50/8** or **Sd-50/40**. A closure on the 'D/White' input will enable the scheduling. Note that this input 'fails safe'. An opening disables the scans of the schedules, and a closure enables them.
- 9) RTC input Status:
- A) If GPS data is being received, it displays the GPS geographic data.
 - a) Latitude
 - b) Longitude
 - c) Elevation
 - d) Speed
 - e) Heading
 - f) Number of satellites being received
 - g) Horizontal Dissolution of Precision: This is an indication of the relative accuracy of the signal being received. The more satellites being used, the greater the accuracy of the received signal.
- 10) AutoDownload 'Set' information.
- a) Name of the AutoDownload File (in DOS 8.3 format).
 - b) Number of shows in AutoDownload file.
 - c) Number of channels in AutoDownload file.
 - d) Offset to first channel stored in AutoDownload file.
- 11) Information on the currently loaded show.
- a) Name of the Show (in DOS 8.3 format).
 - b) Status of the show:
 - i) Stopped
 - ii) Playing (at the end of the show it will stop)
 - iii) Looping (at the end of the how, it may or may not play another show. A message will be displayed if it has been set to do nothing at the end of this show.
 - iv) Paused. Playing or Looping, but it has been paused.
 - c) Frame number that the show is at.
- 12) Information on the currently loaded SoundFiles.
- a) Name of the Show (in DOS 8.3 format).
 - b) Status of the Sound playback:
 - i) Stopped
 - ii) Playing (at the end of the SoundFile it may or may not play another sound file).
 - iii) Looping. At the end of the sound, it will loop the same SoundFile as seamlessly as possible.
 - iv) Paused. Playing or Looping, but it has been paused.
 - c) Name of the SoundFile (in DOS 8.3 format).

- d) Seconds into the SoundFile.
 - e) Volume of the left and right sides of the repeater output. A value of 255 is at maximum. It displays 'muted' when not playing.
- 14) RTC or GPS time.
- a) If Daylight Savings Time is in effect, it will display 'dst' if in the Northern hemisphere, or 'sdst' if in the Southern hemisphere.
 - b) Time
 - c) Day of Week
 - d) Date
 - e) Schedule being used, or 'none loaded' if no schedule file has been found, or 'none today' if there is a schedule being used on this day. Note that the schedule being used is only updated on even minutes, as the schedule is scanned.
- 15) Daylight Savings Time settings.
- 17) ServoMotor Outputs. This line shows the numbers on enabled ServoMotor outputs 'Servo0', 'Servo1', etc.. Outputs which have not been enabled for using a ServoMotor PWM output will be labeled 'n/a0', 'n/a1', 'n/a2', etc..
- 18) Minimum PWM pulse width which will be sent to each ServoMotor output on the '[¼ J6](#)' port. The default for the minimum pulse width is 1.000 ms.
- 19) Maximum PWM pulse width which will be sent to each ServoMotor output on the '[¼ J6](#)' port. The default for the maximum pulse width is 2.000 ms.

a) Play a Sound

This command is available ONLY if SoundFiles have been found on the installed Sd flash card.

This prompts you for a SoundFile number to play. It will only let you enter valid sound numbers. Once started, the sound 'info' line will change to reflect the status of the sound file that was just started. If the sound file has been configured to do a 'seamless loop' at the end, the 'info' line will report the sound as 'looping', instead of the more usual 'playing'.

b) Stop Sound

This command is available ONLY if SoundFiles have been found on the installed Sd flash card.

This stops any sound which is playing immediately. If the sound which is playing is 'unsteppable', then using this command to stop the sound will allow you to then start a new sound playing. Once stopped, the sound 'info' line will change to reflect the status of the sound file.

d) Daylight Savings Time

At the first prompt, you can

- Y) Tell the **Sd-50/8** or **Sd-50/40** to automatically adjust for Daylight Savings Time (DST). It will use the rules you have set for the part of the world you live in, or when the U.S. Congress changes it again instead of doing something substantial about energy policy.
- N) Tell the **Sd-50/8** or **Sd-50/40** NOT to adjust for Daylight Savings Time (DST).

C) Change the rules to use for Daylight Savings time. Rules for the DST allow you to set:

- 1) the starting month
- 2) ending month
- 3) what time of day the transition will take place (typically 2:00 am)
- 4) when in the starting or ending month the transitions take place. You can select:
 - a) A specific date within the month for the transition. Valid dates are one through 28, 29, 30, or 31 (depending on the length of the month selected).
 - b) The day of week (DOW) for the transition (typically this is on a Sunday). Valid entries are 1 (Sunday) through 7 (Saturday). Once you select the DOW, you can then select the:
 - 1) First occurrence of the selected DOW in the month.
 - 2) Second occurrence of the selected DOW in the month.
 - 3) Third occurrence of the selected DOW in the month.
 - 4) Fourth occurrence of the selected DOW in the month.
 - 5) Last occurrence of the selected DOW in the month.

If the DST starting month is after the DST ending month, then the **Sd-50/8** or **Sd-50/40** assumes that it is located in the Southern Hemisphere, and the DST is active at the opposite time of year as it would be in the Northern Hemisphere. When Daylight Savings Time is active in the Southern hemisphere, it will display 'sdst' before the time instead of the usual 'dst' displayed in the Northern Hemisphere.

Adjusting the DST rules will also enable DST when you are through.

Z) Change century. The GPS and RTC chip don't provide the **Sd-50/8** or **Sd-50/40** with the century. Assuming any of us survive past the year 2099, this allows you to set the century to '21' for the next hundred years, then '22' for the next hundred years, and so on. The **Sd-50/8** and **Sd-50/40** have been programmed to support the current Gregorian calendar rules for leap years until the year 9,999.

e) Stop at End

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This clears the 'looping' flag, so the currently running show (if any) will stop at the end and wait for the next start command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

h) Set Time

*This command is only available if the **Sd-50/8** or **Sd-50/40** is not listening to the time and location signals received from a GPS receiver. If the GPS is active, it will display the time from the GPS and set the time very accurately every minute, on the half minute.*

This command is used to set the Real Time Clock (RTC) manually.

i) Show Info

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This displays the vitals of the shows which have been downloaded to the **Sd-50/8** or **Sd-50/40**:

```
-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
Header: 00 20 CC 3D EC 0A 00 08 02 00 01 00 02 00 01 00 02 00 01 00 02 00 01 00
show number/name          Start                Length              Flags              "next" show
01h/___1 CRoom1_A: 000000h/___12345 | 001194h/___4500 | EDh | 01h/___1 CRoom1_A.sho
02h/___2 CRoom1_B: 001194h/___4500 | 000708h/___1800 | CDh | 02h/___2 CRoom1_B.sho
03h/___3 CRoom1_C: 00189Ch/___6300 | 000708h/___1800 | CDh | 03h/___3 CRoom1_C.sho
04h/___4 CRoom1_D: 001FA4h/___8100 | 000708h/___1800 | CDh | 04h/___4 CRoom1_D.sho
05h/___5 CRoom1_E: 0026ACh/___9900 | 000708h/___1800 | CDh | 05h/___5 CRoom1_E.sho
06h/___6 CRoom1_F: 002DB4h/___11700 | 000708h/___1800 | CDh | 06h/___6 CRoom1_F.sho
07h/___7 CRoom1_G: 0034BCh/___13500 | 000708h/___1800 | CDh | 07h/___7 CRoom1_G.sho
08h/___8 CRoom1_H: 003BC4h/___15300 | 000708h/___1800 | CDh | 08h/___8 CRoom1_H.sho
09h/___9 CR1_Xa_: 0042CCh/___17100 | 00001Eh/___30 | CDh | 09h/___9 CR1_Xa_.sho
0Ah/___10 CR1_LOff: 0042EAh/___17130 | 00001Eh/___30 | CDh | 0Ah/___10 CR1_LOff.sho
hit any key
```

The info on this screen will help you confirm that the shows are the ones you thought they were and that they are in the order you expected them to be in. Worst case, if things are not operating as you would expect, Gilderfluke & Company technicians can use this screen to help diagnose your problems.

l) Loop a Show

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to request and play a specific show with the 'looping' flag set. If the currently running show (if any) is NOT steppable, The **Sd-50/8** or **Sd-50/40** will confirm with you that you do indeed want to start another show. At the end of the show (if it has been configured to do so), the next show will play. This will continue until the **Sd-50/8** or **Sd-50/40** is told to 'Stop', 'Stop at end' or a different show with is started with a 'start' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

m) Display Config. from Sd

This displays a second page of configuration information. See the next section of the manual for the commands available on the 'configuration' page.

o) Reload Defaults

This reloads the default values for all the animation variables. It does not affect the variables used to trigger sounds. These are set through the '**SdConfig.exe**' program. Any Sd flash card that is inserted into the **Sd-50/xx** will be checked for a valid configuration file. If the **Sd-50/xx** finds a valid configuration file, and it is different from what is already loaded into the player, it will be read from the Sd flash card and used to configure the card.

p) Play a Show

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to request and play a specific show with the 'looping' flag cleared. If the currently running show (if any) is NOT steppable, The **Sd-50/8** or **Sd-50/40** will confirm with you that you do indeed want to start another show. At the end of the show the **Sd-50/8** or **Sd-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

s) Stop Show

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command stops any show which is playing or looping immediately. The **Sd-50/8** or **Sd-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

u) Set ServoMotor Endpoints

*This command is the only way to adjust the electronic travel endpoints for any model airplane-style ServoMotors used with an **Sd-50/8** or **Sd-50/40**.*

*Unlike ALL of the other serial configuration commands, the ServoMotor 'Endpoint' settings will remain in effect as other Sd flash cards with different **Sd-50.cfg** files on them are inserted into the player.*

*If you have to manually enable the ServoMotors before adjustment, this setting may not be there after you change to other Sd flash cards with different **Sd-50.cfg** files on them. Whether individual ServoMotor PWM outputs are enabled or not is normally set using the '**SdConfig.exe**' program, and stored in the **Sd-50.cfg** files.*

Model Airplane-style ServoMotors use a Pulse Width Modulated control signal. This is a series of pulses sent to each ServoMotor with a positive pulse width (nominally) between .001 and .002 seconds (1.0 ms to 2.0 ms) to give a 90° rotation on the ServoMotor's output shaft. These pulses are sent to each ServoMotor fifty times each second. A 1.0 ms pulse tells the ServoMotor to 'retract' to its 'minimum' position. A 2.0 ms pulse width tells the ServoMotor to 'extend' to its 'maximum' position. A pulse width of 1.5 ms would tell the motor to move to the 'halfway' position.

In the **Sd-50/8** or **Sd-50/40**, the ServoMotor PWM is 'eight bit resolution'. This means that there are 256 tiny steps between fully retracted and fully extended. If you need higher resolution, a **Ser-DMX** or **Bt-Servo** can be used for 'twelve bit resolution'. This gives 4096 steps between fully retracted and fully extended. This is a finer resolution than most ServoMotors can resolve.

Most ServoMotors actually will accept pulse widths that are much wider than those provided by the radios they were designed to work with. Typically this is from 0.5 ms to 2.5 ms. This command lets you set the pulse width for each end of the ServoMotor's stroke.

This command asks which ServoMotor you want to adjust (0-7). If the ServoMotor you select is not currently set for use as a ServoMotor, then it will ask if you want to make it so. Once the ServoMotor is selected, a special menu is displayed which shows how the ServoMotors are adjusted:

-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
 Use your computers keypad as shown to adjust servo endpoints.
 Adjust the "minimum" first, then adjust the "maximum".

```
adjust-->  Minimum Maximum Position
           |-----|
           | 7   | 8   | 9   |
           |-----|
middle-->  | 4   | 5   | 6   |
           |-----|
           | 1   | 2   | 3   |
           |-----|
```

1, 4, 7, and - also set position to minimum
 2, 5, 8, and + also set position to maximum
 <CR> to save changes, <Esc> to discard

```
original:
  minimum | maximum |
  0.8164ms | 1.8164ms |

new:
  minimum | maximum | position
  0.8164ms | 1.8164ms | _56
```

The ServoMotors are adjusted using the following procedure:

- 1) Adjust the ServoMotor 'retract' endpoints using the numbers '1', '4' and '7'. If you have a numeric keypad on your computer, this will be the left column of numbers. As you do this, the ServoMotor will be sent to the 'minimum' position. Just position the ServoMotor to wherever you would like it to be when it is at its minimum.
- 2) Next adjust the 'Extend' position of the ServoMotor using the '2', '5' and '8' keys. If you have a numeric keypad on your computer, this will be the middle column of numbers. The ServoMotor will be sent to the 'maximum' position as you make your adjustments. Just position the ServoMotor to wherever you would like it to be when it is at its maximum.
- 3) Use the '3', '6', '9', '+' and '-' keys to test your adjustments. If you have a numeric keypad on your computer, this will be the right column of numbers. Repeat steps #1 and #2 as needed to refine your adjustments.
- 4) When you are done making your adjustments, hit the <Return> key to lock them in, or the <ESC>ape key to exit without saving your changes.

v) Verify Shows

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to test the show data which has been downloaded to the **Sd-50/8** or **Sd-50/40**. This will take anywhere from a few seconds to several minutes, depending of the size of the AutoDownload file that must be tested. If there is a Schedule.sch file loaded on your **Sd-50/8** or **Sd-50/40**, it will give you the option of verifying the schedule or shows, if both have been downloaded, if no shows have been downloaded, but a schedule file has, then this command will automatically verify the schedule.

x) Exit

This is used to exit the configuration mode. It will ask you to press 'y' or 'n' before completing the command.

z) Set Time Zone

This command is used to offset how much time must be added or subtracted from the Universal Coordinated Time (UCT, also known as 'Zulu' time) to display the local time. You can set whether time is added or subtracted from UCT for the local 'standard' time and the number of hours (valid numbers are 0 through 15). For those few places in the world that need it, you can also set the number of minutes to add at 0, 15, 30 or 45 minutes on top of the number of hours to be added/subtracted.

The amount of time should be set to offset to 'standard' time wherever you are. Do not offset to DST! The DST rules will take care of the Daylight Savings Time for you.

Pacific Standard time is -8:00.

Mountain Standard Time is -7:00.

Central Standard Time is -6:00.

Eastern Standard Time is -5:00.

Secondary Configuration Menu

This menu is entered through [‘main’ configuration screen](#) by using the command ‘m’, ‘Config’.

This menu is exited in the same way, by using the command ‘m’, ‘Config’. This puts you back at the [‘main’ configuration screen](#).

This displays the configuration which is (mostly) from the [Animation Control Setup](#) tab on the ‘SdConfig.exe’ program. This configuration is normally downloaded from the Sd flash card when the **Sd-50/xx** is powered up.

As with the ‘main’ configuration page, any changes in the configuration made through the serial port configuration commands will only ‘stick’ until an Sd flash card is inserted with a valid **Sd-50.cfg** file with a different date or time stamp than what was in the **Sd-50/xx** before you changed the configuration. This means that the configuration will ‘stick’ as long as you use the same Sd flash card that was in the **Sd-50/xx** before you changed the configuration (or a duplicate of it), or you only insert Sd flash cards that have no **Sd-50.cfg** file on them.

This command brings up the following menu:

```
-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
Configuration....

1) serial addr: 00h/__0

Midi:
2) MIDI chan: 00h/__0
3) 1st note: 00h/__0

4) MCU chan: 005h/__5
5) Left vol: 006h/__6
6) Right vol: 007h/__7
7) 1st output:000h/__0
8) 1st Servo: 006h/__6
9) eeFlag0: 10h/__16 / 00010000b / DMX-512 Tx
c) eeFlag1: 41h/__65 / 01000001b
d) eeFlag2: 00h/__0 / 00000000b
f) eeFlag3: 00h/__0 / 00000000b
g) eeFlag4: 7Fh/127 / 01111111b
h) eeFlag5: 00h/__0 / 00000000b
a) play a sound      b) stop sound      o) reload defaults  z) time Zone: -08:00
l) Loop show        p) Play show       s) Stop show        e) stop at End
v) Verify shows     i) show Info       m) Config           x) eXit

Command-
```

These numbers should agree with what you set using the ‘SdConfig.exe’ program. If they do not, you can double check that it is receiving the configuration by changing one of these numbers, powering the **Sd-50/xx** down, waiting 10 seconds, and powering it back up again. If the **Sd-50/xx** has successfully booted, the values you changed should have reverted to whatever is in the configuration set by the ‘SdConfig.exe’ program.

1) Serial Address

This is the serial address of the **Sd-50/xx**. Even though the **Sd-50/xx** is normally accessed through the RS-232 serial port, the address is still needed to access the **Sd-50/xx**. Valid address values are from 0 to 255. The default value for the Serial Address is ‘0’.

2) MIDI channel

This is the MIDI instrument number used to access the **Sd-50/8** or **Sd-50/40** through the [MIDI in](#) port. Valid address ranges are 00h through 0Fh (0 through 15 in decimal numbers).

3) MIDI 1st Note

Legal [MIDI in](#) notes are numbered from 00h through 7Fh (0 through 127 in decimal numbers). The only problem is that if you are actually using a keyboard to access the **Sd-50/8** or **Sd-50/40**, no keyboards actually have all 128 keys. A real piano only has 88. 'Middle C' is located at 3Ch (or 60 in decimal numbers) on all MIDI keyboards. You can count the keys to the South and North of 'Middle C' to determine what numbers your keyboard will actually generate.

Numbers below the value you set for the 'MIDI Note Offset' will be ignored. If you wanted to start accessing the features of the **Sd-50/8** or **Sd-50/40** at 'Middle C', you would set this offset to 3Ch (or 60 in decimal numbers).

4) MCU Control Channel

This is the [Animation 'Virtual' MCU Trigger](#) channel which is set to the **.Mp3/wav player** to select and play SoundFiles, ramp audio to a level, stop and pause. Valid values are from 0 to 511. This is normally set to a channel which is not used for any of the Show Control outputs, but it can be if this suits your application. The default value for the [Animation 'Virtual' MCU Trigger](#) Channel is '1' for an **Sd-50/8** or '5' for an **Sd-50/40**.

5) Left Level Control

If using audio control from the Show Control side of the **Sd-50/xx**, then this is the Show Control channel which will control the left audio output level. Valid values are from 0 to 511. The default value for the Left Level Control Channel is '2' for an **Sd-50/8** or '6' for an **Sd-50/40**.

6) Right Level Control

If using audio control from the Show Control side of the **Sd-50/xx**, then this is the Show Control channel which will control the right audio output level. Valid values are from 0 to 511. The default value for the Right Level Control Channel is '3' for an **Sd-50/8** or '7' for an **Sd-50/40**.

7) First Show Control Output Channel

This is the first channel of Show Control data which will be sent to the first Show Control Outputs. Valid values are from 0 to 511. The default value for the First Show Control Output Channel is '0' for an **Sd-50/8** or **Sd-50/40**.

8) First ServoMotor Channel

This is the first channel of Show Control data which will be sent to the first Show Control Outputs. Valid values are from 0 to 511. The default value for the First ServoMotor Control Channel is '2' for an **Sd-50/8** or '6' for an **Sd-50/40**. These default addresses would overlap with the two volume control channels. If you are using both ServoMotor PWM outputs and the RealTime volume control through the animation data, you will need to move the addresses used for one or the other.

9) eeFlag0

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. You really shouldn't muck with these. Following this line are the DMX/MIDI serial port settings. These are controlled by the bits in eeFlag0. They will show:

- bit0) [DMX-512](#) Rx: DMX-512 reception is enabled.
- bit1) [MIDI in](#) Rx: MIDI reception is enabled.
- bit2) [Net Serial](#) Rx: Net Serial reception is enabled.
- bit3) [IR Mode](#) Rx: IR Mode reception is enabled.

a) Play a Sound

This command is available ONLY if SoundFiles have been found on the installed Sd flash card.

This prompts you for a SoundFile number to play. It will only let you enter valid sound numbers. Once started, the sound 'info' line will change to reflect the status of the sound file that was just started. If the sound file has been configured to do a 'seamless loop' at the end, the 'info' line will report the sound as 'looping', instead of the more usual 'playing'.

b) Stop Sound

This command is available ONLY if SoundFiles have been found on the installed Sd flash card.

This stops any sound which is playing immediately. If the sound which is playing is 'unsteppable', then using this command to stop the sound will allow you to then start a new sound playing. Once stopped, the sound 'info' line will change to reflect the status of the sound file.

c) eeFlag1

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. You really shouldn't muck with these.

d) eeFlag2

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. This byte is currently unused. You really shouldn't muck with these.

e) Stop at End

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This clears the 'looping' flag, so the currently running show (if any) will stop at the end and wait for the next start command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

f) eeFlag3

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. You really shouldn't muck with these.

g) eeFlag4

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. The bits in this flag are used to enable the ServoMotor PWM outputs on the '[¼ J6](#)' port.

h) eeFlag5

These are the binary 'flag' settings from the '**SdConfig.exe**' program. Valid values are from 00h to FFh. This byte is used to set up for [multilingual](#) support when using [IR Trigger Mode](#) for triggering sounds and shows.

i) Show Info

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This displays the vitals of the shows which have been downloaded to the **Sd-50/8** or **Sd-50/40**:

```
-Gilderfluke & Co. Sd-50/40 Audio/Show Controller vers. 1.00 copyright 2007 DCM-
Header: 00 20 CC 3D EC 0A 00 08 02 00 01 00 02 00 01 00 02 00 01 00 02 00 01 00
show number/name      Start                Length              Flags              "next" show
01h/_1 CRoom1_A: 000000h/_12345 | 001194h/_4500 | EDh | 01h/_1 CRoom1_A.sho
02h/_2 CRoom1_B: 001194h/_4500 | 000708h/_1800 | CDh | 02h/_2 CRoom1_B.sho
03h/_3 CRoom1_C: 00189Ch/_6300 | 000708h/_1800 | CDh | 03h/_3 CRoom1_C.sho
04h/_4 CRoom1_D: 001FA4h/_8100 | 000708h/_1800 | CDh | 04h/_4 CRoom1_D.sho
05h/_5 CRoom1_E: 0026ACh/_9900 | 000708h/_1800 | CDh | 05h/_5 CRoom1_E.sho
06h/_6 CRoom1_F: 002DB4h/_11700 | 000708h/_1800 | CDh | 06h/_6 CRoom1_F.sho
07h/_7 CRoom1_G: 0034BCh/_13500 | 000708h/_1800 | CDh | 07h/_7 CRoom1_G.sho
08h/_8 CRoom1_H: 003BC4h/_15300 | 000708h/_1800 | CDh | 08h/_8 CRoom1_H.sho
09h/_9 CR1_Xa: 0042CCh/_17100 | 00001Eh/_30 | CDh | 09h/_9 CR1_Xa.sho
0Ah/_10 CR1_LOff: 0042EAh/_17130 | 00001Eh/_30 | CDh | 0Ah/_10 CR1_LOff.sho

hit any key
```

These will help you confirm that the shows are the ones you thought they were and that they are in the order you expected them to be in.

l) Loop a Show

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to request and play a specific show with the 'looping' flag set. If the currently running show (if any) is NOT steppable, The **Sd-50/8** or **Sd-50/40** will confirm with you that you do indeed want to start another show. At the end of the show (if it has been configured to do so), the next show will play. This will continue until the **Sd-50/8** or **Sd-50/40** is told to 'Stop', 'Stop at end' or a different show with is started with a 'start' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

m) **Display Config. from Sd**

This returns to the main page of configuration information. See the last section of the manual for the commands available on the 'configuration' page.

o) **Reload Defaults**

This reloads the default values for all the animation variables. It does not affect the variables used to trigger sounds. These are set through the '**SdConfig.exe**' program. Any Sd flash card that is inserted into the **Sd-50/xx** will be checked for a valid configuration file. If the **Sd-50/xx** finds a valid configuration file, and it is different from what is already loaded into the player, it will be read from the Sd flash card and used to configure the card.

p) **Play a Show**

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to request and play a specific show with the 'looping' flag cleared. If the currently running show (if any) is NOT steppable, The **Sd-50/8** or **Sd-50/40** will confirm with you that you do indeed want to start another show. At the end of the show the **Sd-50/8** or **Sd-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

s) **Stop Show**

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command stops any show which is playing or looping immediately. The **Sd-50/8** or **Sd-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Sd-50/8** or **Sd-50/40** except during testing. Use the equivalent Serial Port command instead.

t) **Verify Shows**

*This command is available ONLY if ShowFiles have been loaded on the **Sd-50/8** or **Sd-50/40**.*

This command is used to test the show data which has been downloaded to the **Sd-50/8** or **Sd-50/40**. This will take anywhere from a few seconds to several minutes, depending of the size of the AutoDownload file that must be tested. If you have a Schedule.SCH file loaded on your **Sd-50/8** or **Sd-50/40**, it will give you the option of verifying the schedule or shows, if both have been downloaded, If no shows have been downloaded, but a schedule file has, then this command will automatically verify the schedule.

x) **Exit**

This is used to exit the configuration mode. It will ask you to press 'y' or 'n' before completing the command.

z) **Set Time Zone**

This command is used to offset how much time must be added or subtracted from the Universal Coordinated Time (UCT, also known as 'Zulu' time) to display the local time. You can set whether time is added or subtracted from UCT for the local 'standard' time and the number of hours (valid numbers are 0 through 15). For those few

places in the world that need it, you can also set the number of minutes to add at 0, 15, 30 or 45 minutes on top of the number of hours to be added/subtracted.

The amount of time should be set to offset to 'standard' time wherever you are. Do not offset to DST! The DST rules will take care of the Daylight Savings Time for you.

Pacific Standard time is -8:00.

Mountain Standard Time is -7:00.

Central Standard Time is -6:00.

Eastern Standard Time is -5:00.

Sd-50/0, Sd-50/8 or Sd-50/40 Software Installation

There are three pieces of software that you may need to install on your computer to use the **Sd-50/xx**. These are:

- 1) '**SdConfig.exe**': The Gilderfluke '**SdConfig.exe**' program is used to configure what all the trigger inputs do, volume levels are, and all the other non-animation settings for the **Sd-50/xx**.

If you are going to let Pc•MACs configure the **Sd-50/8** or **Sd-50/40** for you, you probably will never need to use the '**SdConfig.exe**' program.

- 2) '**GilderTerm.exe**'

This is the Gilderfluke & Company program that is used to talk to the **Sd-50/xx** through the serial port. Although you can use any serial 'terminal' program with the **Sd-50/xx**, GilderTerm makes communications easier as it has all the GilderCommands built in. You just need to point it at the appropriate serial port. The other communications settings are already set.

- 3) '**PC•MACs.exe**': This program is used to program the animation sequences that are used to control the digital (on/off) Show Control Outputs, [DMX-512](#) outputs, ServoMotor PWM outputs, etc.. If you aren't programming the animation outputs on an **Sd-50/8** or **Sd-50/40**, you won't be needing this program.

Detailed instructions for the PC•MACs program are found in the PC•MACs manual, which can be downloaded from www.gilderfluke.com website.

The software for the **Sd-50/xx** is distributed from Gilderfluke & Company on CD-ROM, or can be downloaded from our www.gilderfluke.com website or emailed to you. If you download it or get it via email, it will probably be zipped, and you will need to decompress it before it can be installed.

The **Sd-50/xx** Configurator program, '**SdConfig.exe**', will need to be moved to somewhere you can find it again. Usually, this is in the same folder as the other Gilderfluke programs: 'c:/Program Files/Gilderfluke/'. You will want to add a shortcut to this on your desktop and/or 'start' menu. Do this by 'left clicking' in the **SdConfig.exe** and dragging and dropping it on the desktop or 'start' menu. When you release the left mouse button, Windows will ask you what you want to do there. Tell it to make a 'shortcut'.

Software/Firmware Versions

There are three different pieces of software and firmware used in an **Sd-50/xx**:

'SdConfig.exe'

This program lives on your PC. It can be easily updated by replacing the program on your PC. The software revision number is found under the 'Help' pulldown under the 'about':



Firmware

This is the least likely to need updating. It resides in a microcontroller on the **Sd-50/xx**. The revision number of this firmware is shown at the top of all the configuration screens accessed through the serial port of the **Sd-50/xx**. The next section describes how it is updated.

Updating Firmware on an Sd-50/0, Sd-50/8 or Sd-50/40

We have made firmware upgrades on the **Sd-50/xx** as simple as possible.

The firmware update files are named:

'Sd50-00.frm'

'Sd50-08.frm'

'Sd50-40.frm'

These normally come packaged together in a zipped file named 'Sd-50-xx firmware v1.00.zip'. This can be downloaded from www.gilderfluke.com on the 'downloads' page.

The revision number shown in the name of the zipped file will reflect the revision number of this update. This information is added to the name of the zipped file simply for us poor humans to recognize different versions. The **Sd-50/xx's** use the date and times that are encoded inside the firmware files.

Once you have downloaded the firmware file from our website, just decompress the files and drag-drop them onto an Sd flash card. If you know which flavor of the the **Sd-50/xx** you will be updating, then you can move just the appropriate firmware file. When you insert this card into the **Sd-50/xx**, it will check the firmware file date with the firmware that is already loaded in the player. If the file is newer, it will download the new firmware into the player.

It will only load the appropriate firmware file for the type of player. This is why you can stick all of the different firmware files onto an Sd flash card and use it to update any type of player.

As it downloads the firmware file from the Sd flash card, you will see a very fast alternating flash between the 'heart' and 'DMX' LEDs. This is similar to the flash pattern during a normal AutoDownload, but much faster.

After it reboots, the **Sd-50/xx** will be running the new firmware. You can verify this by opening up any of the [configuration screens](#), or just asking for the '[player status](#)' through the serial port. The header info includes the firmware revision number.

You may need to reload your shows after updating the firmware.

A firmware file on an Sd flash card will have absolutely NO EFFECT on an **Sd-50/xx**, once it has been updated, or if it already holds firmware with an equal or later date than the version on the Sd flash card. A firmware file is only about 180 KBytes. Given the size of most Sd flash cards, this doesn't take up enough space to worry about (.0014 of the space on a 128 MByte card).

If you are distributing shows on Sd flash cards to a number of locations, you can just throw the firmware updates onto the flash cards you use to send out your shows.

Manual Configuration using ‘SdConfig.exe’

The ‘**SdConfig.exe**’ program is a replacement for the older ‘**Mp3Config.exe**’ program. The main difference between the two is the removal of support for the older **Mp3-50/xx** players in the newer ‘**SdConfig.exe**’ program.

The ‘**SdConfig.exe**’ program is only rarely needed to alter or confirm the **Sd-50/8** or **Sd-50/40** configuration. Pc•MACs will have automatically configured the player to match your shows and the SoundFiles used on them, so there is very little need to alter what Pc•MACs has already done for you. Many of the settings that Pc•MACs makes during the AutoDownload process are locked¹ to make it a little harder for you to goof them up.

For an **Sd-50/0**, the ‘**SdConfig.exe**’ program must be used to configure the player before it can be used. Don’t panic. In most cases this is a simple eight step process.

To create, read or manually alter the configuration for an **Sd-50/xx**, you will need to either:

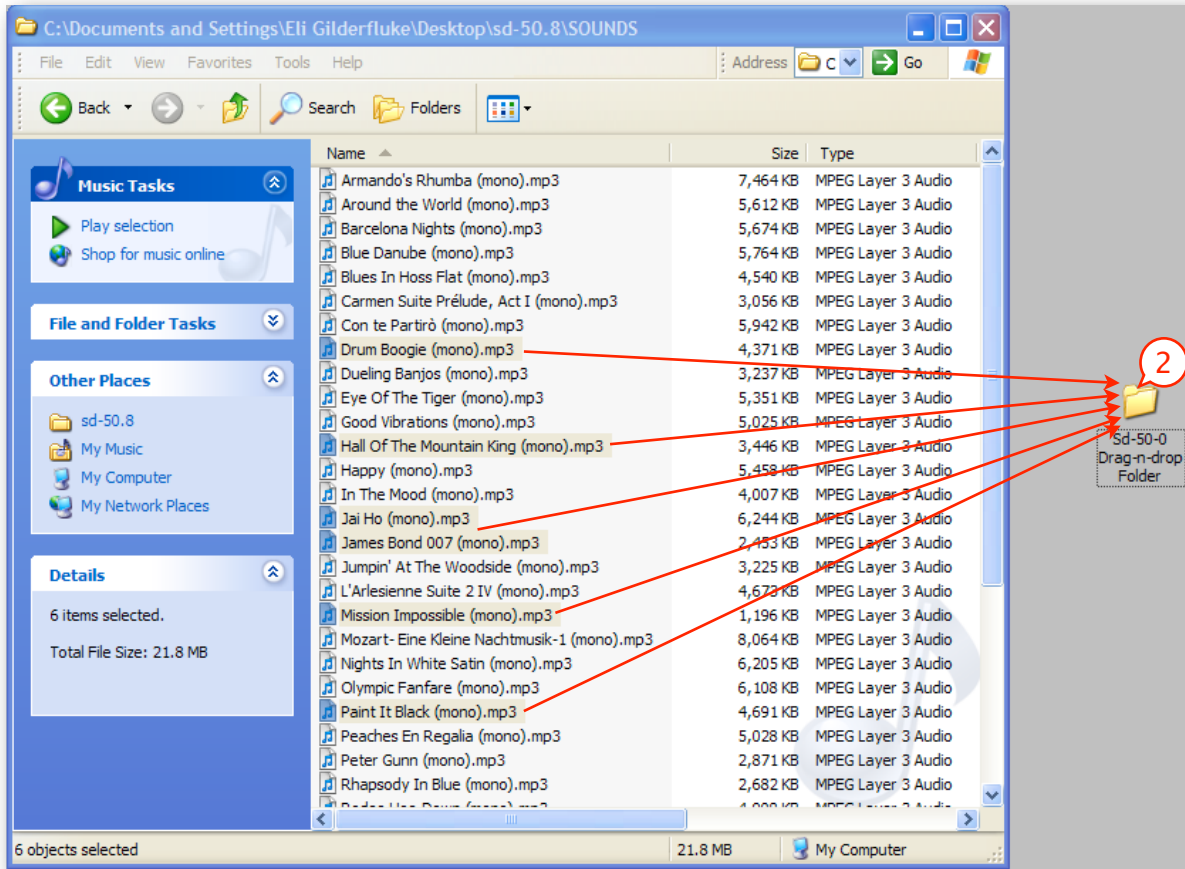
- 1) Access the Sd card directly by removing it from the player and inserting it into an appropriate slot in your computer, or the slot in a USB-to-Sd card reader. A few seconds after inserting the Sd card, an hourglass should appear to indicate that it is being mounted as what the PC thinks it is a ‘Removable Disk’.
- 2) Access a copy of whatever is on the Sd card, but is in a folder somewhere on your computer. The drag-n-drop folders that Pc•MACs creates for an **Sd-50/8** or **Sd-50/40** during the AutoDownload process are an example of just such a folder. You can check/alter the configuration right in the drag-n-drop folder. If you don’t already have a drag-n-drop folder, but have the Sd card that has been running in your **Sd-50/xx**, you can just make an empty folder somewhere on your computer (typically on your desktop, just to make it easier to find and access), and drag-n-drop the contents of the Sd card into this folder. This is then your drag-n-drop folder you can use for checking/altering the configuration for your **Sd-50/xx**. When you are done making any changes to the configuration, just clear off the Sd card (reformatting is the most effective way), and drag-n-drop the contents of the folder you made back onto the Sd card.

If this Sd flash card has already been configured for use in an **Sd-50/xx**, there should be a ‘SOUNDS’ folder, the ‘**SdConfig.exe**’ program, ‘**Schedules.sch**’ file and a ‘**Sd-50.cfg**’ file on it. You should be able to double click on the ‘**Sd-50.cfg**’ file to open the ‘**SdConfig.exe**’ program.

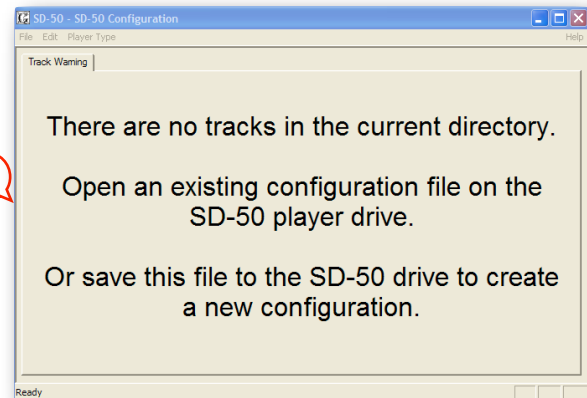
To make a new configuration for an **Sd-50/xx**, take the following steps. This is typically only done for **Sd-50/0s**, since Pc•MACs does this automatically for the **Sd-50/8s** or **Sd-50/40s** during the AutoDownload process:

- 1) Make a new Drag-n-Drop folder on your desktop.
- 2) Drag and drop all the .mp3/.wav audio files you want to use on your **Sd-50/xx** over to the empty Sd flash card or empty drag-n-drop folder.

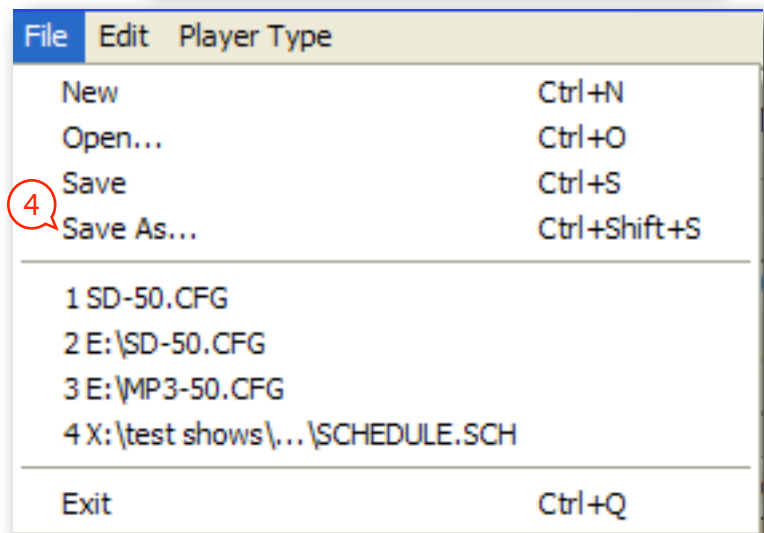
¹ They can be unlocked using a command under the Edit menu.



3) Open the 'SdConfig.exe' program. The 'SdConfig.exe' program will want to know where your .mp3/.wav files are located. It will probably display the following screen because it can't find your SoundFiles:

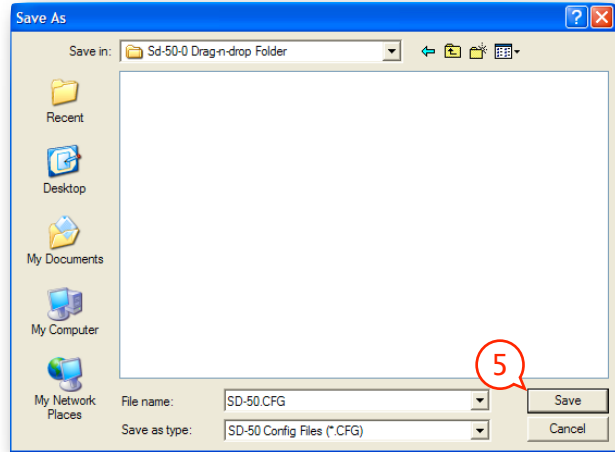


4) Do a 'Save As...' from under the 'File' menu:



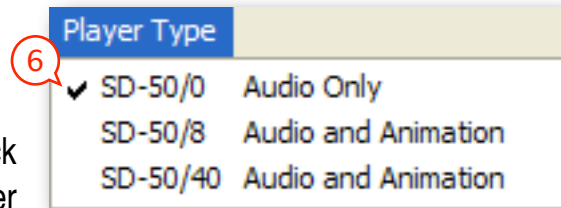
- 5) Don't change the default 'SD-50.cfg' name for the file. Just point Windows at your Sd flash card or drag-n-drop folder, and click 'Save'.

The instant you press 'save', the 'SdConfig.exe' program will organize all of your SoundFiles into a 'SOUNDS' folder, and put a copy of itself and the blank Sd-50.CFG file into the Sd flash card or drag-n-drop folder.



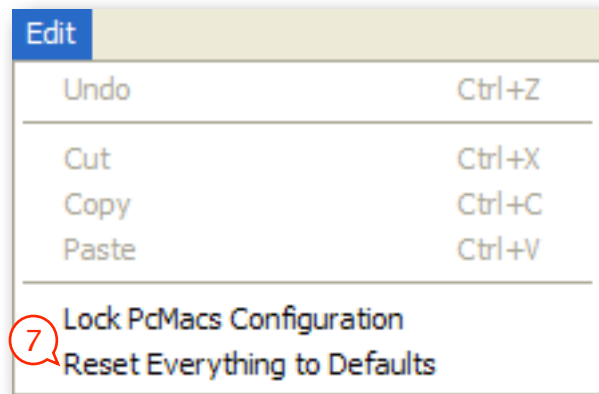
- 6) Select the 'Player Type'. In this case, we are using an **Sd-50/0**....

Now that the 'SdConfig.exe' program knows what type of player it is configuring, the 'Track Warning' message will disappear and the other menu tabs will be shown.



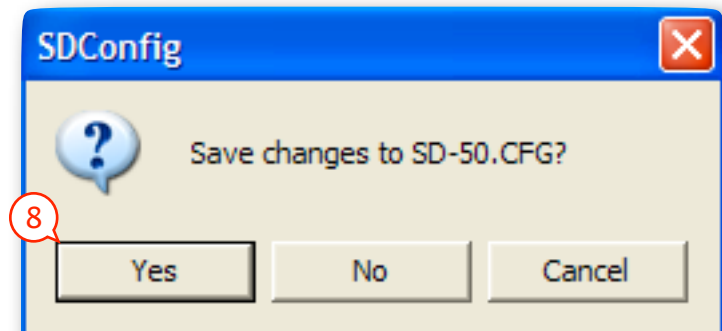
- 7) From under the 'Edit' menu, select 'Reset Everything to Defaults'.

You can manually configure your **Sd-50/xx** player, but for the majority of users the defaults will suffice.



- 8) 'Exit' and 'Save' (or 'Save' and 'Exit')

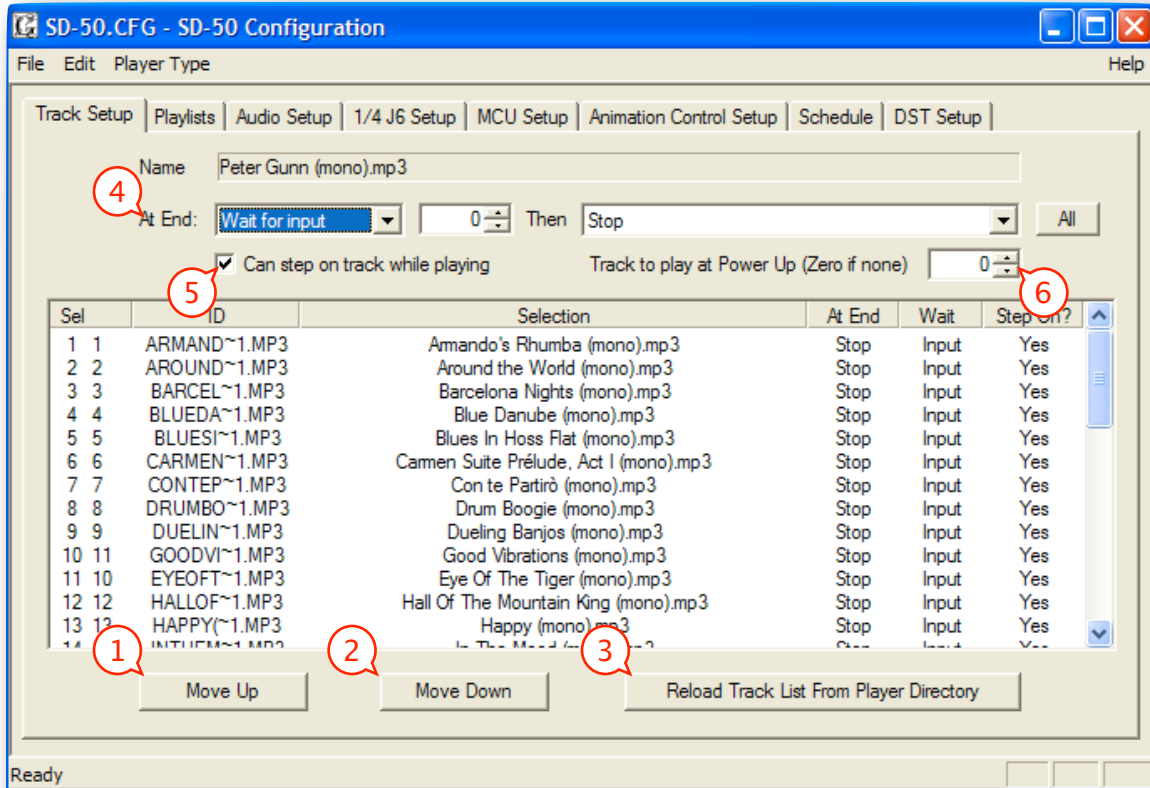
Make sure you answer 'Yes' if it asks you if you want to save your changes....



Track Setup

(Sd-50/0, Sd-50/8, and Sd-50/40)

The .mp3 and .wav SoundFiles are entered and sorted on this menu tab of the 'SdConfig.exe' program. To find your SoundFiles, you must point it to the disk that contains your .mp3 and .wav files. This is usually the Sd flash card that will be inserted in the **Sd-50/xx**. Up to 255 .mp3/.wav audio files can be loaded onto the **Sd-50/xx's** Sd flash card at the same time.



1) Move Up

2) Move Down

You must have previously selected one of the SoundFiles from your track list to use these commands.

The SoundFiles are loaded in 'Windows' order by default. This button allows you to select and reorder the SoundFiles on the Sd flash card. The first two columns show the number of the track, then the original number of the track before it was moved up or down in this list (in this example, SoundFiles #10 and #11 have been switched).

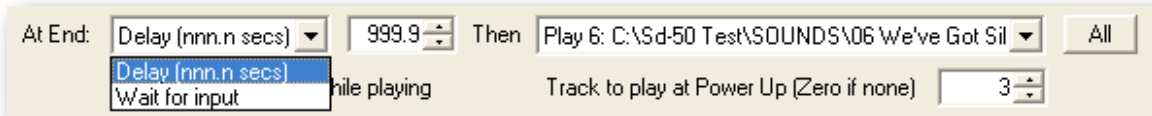
3) Reload Track List From Directory

This button is used to refresh the list of SoundFiles loaded on the Sd flash card. It is used when you have changed the name or number of SoundFiles loaded on the Sd flash card.

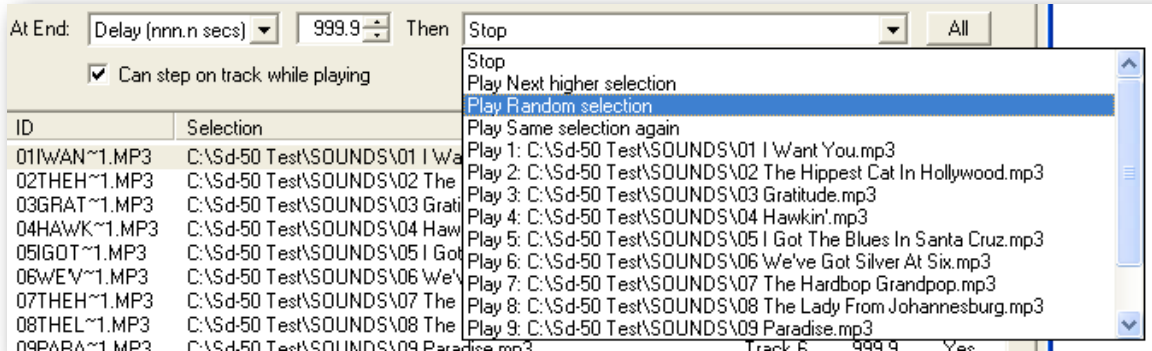
4) At End

You must have previously selected one of the SoundFiles from your track list to use this command.

You can set what will happen at the end of any of the SoundFiles. It can either sit there and wait for the next input, or delay between 0 and 999.9 seconds (16.65 minutes) and play another track:



After the delay (or immediately), you can set it to do any of the following:



a) Stop

No SoundFile is selected or played at the end. The delay time is not used when set to 'Stop' at the end of a sound.

b) Play Next Higher Selection

This plays the next SoundFile sequentially at the end of the previous SoundFile. This setting is used to play all the SoundFiles 'round robin'. At the end of the list, the first track will be played again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) between each SoundFile.

c) Play Random Selection

This plays a SoundFile picked at random from all the SoundFiles on the Sd flash card at the end of the previous SoundFile. As an option, you can delay between each SoundFile from 0 to 999.9 seconds (16.65 minutes).

d) Play Same Selection Again

This selects and plays the same SoundFile again (and again and again and again.....), optionally after a delay of 0 to 999.9 seconds (16.65 minutes). This is how you would choose to loop any single SoundFile. If the delay time has been set to 'zero', then the audio player will loop the sound as 'seamlessly' as possible. For best results, use .wav files for 'seamless' looping. .mp3 files need a little bit of time to get rolling, so there will always be a bit of delay when looping .mp3 files. Because they don't have to decompress the audio before it is played, .wav files don't need this time to get rolling, so they will loop better.

e) Play Specific SoundFile

This selects and plays a specific SoundFile from among those loaded on the Sd flash card at the end of the previous SoundFile. This is how you would choose to create a 'chain' SoundFiles that plays in a specific order. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) between each SoundFile.

5) Can Step On Track with a new Play request

You must have previously selected one of the SoundFiles from your list at the bottom of this window to use this command.

When checked, the selected track can be interrupted mid-play by a request for another .mp3/.wav SoundFile to begin playing. If not checked, any requests of other audio files to start will be ignored. The only way to interrupt a SoundFile which can't be interrupted is to stop it.

6) Track to Play at PowerUp

Whatever track you select will automatically begin playing as soon as the **Sd-50/xx** is powered up. For **Sd-50/0** applications where they simply loop sounds all day long, this is how you start the SoundFiles playing without using an external switch closure or controller.

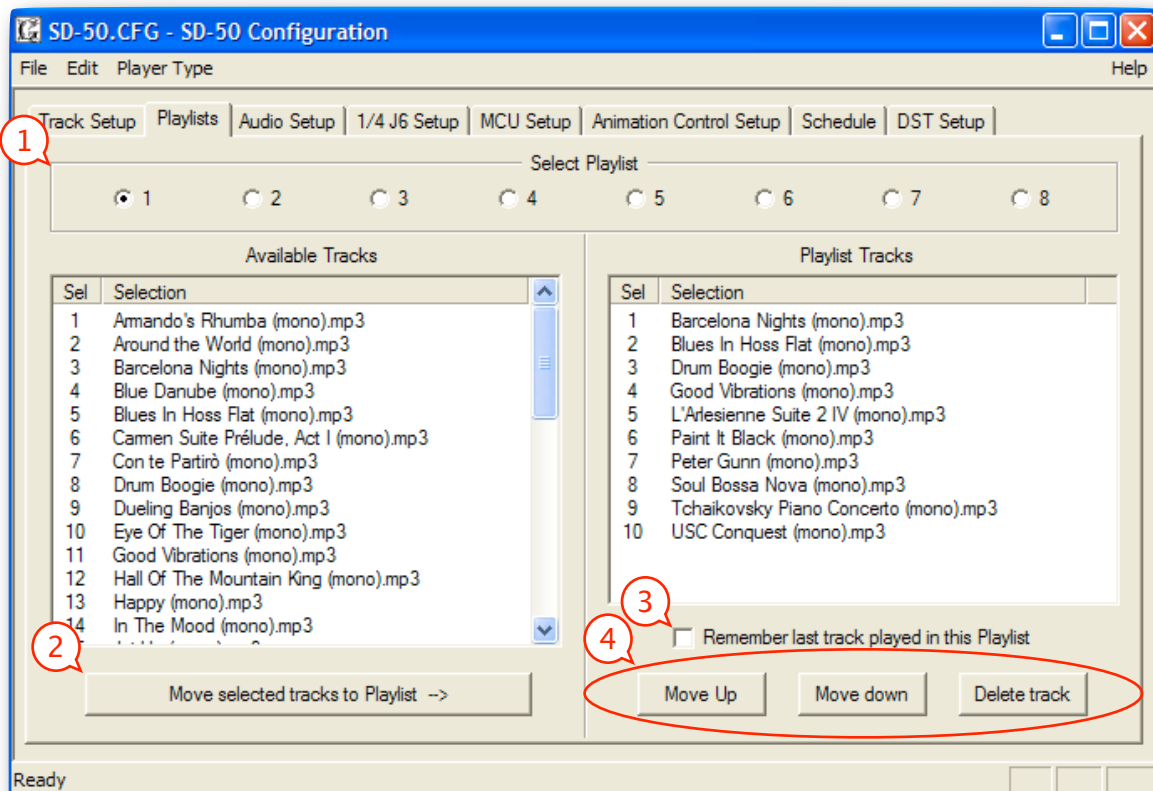
Playlist Setup

(Sd-50/0, Sd-50/8, and Sd-50/40)

You can create up to eight lists of SoundFiles. Any SoundFile stored on the **Sd-50/xx'** Sd flash card (shown on the '[Track Setup](#)' tab) can be added to any list. SoundFiles can appear in the same PlayList more than once. Each playlist holds up to 32 SoundFiles.

The lists can be accessed from the trigger inputs or at the end of any SoundFile. In most cases, SoundFiles can be selected to play 'round robin' or randomly from a list.

A typical application would have one input triggering SoundFiles from one list randomly, while another input triggers the SoundFiles on another list in a 'round robin' fashion.



To create a 'Playlist':

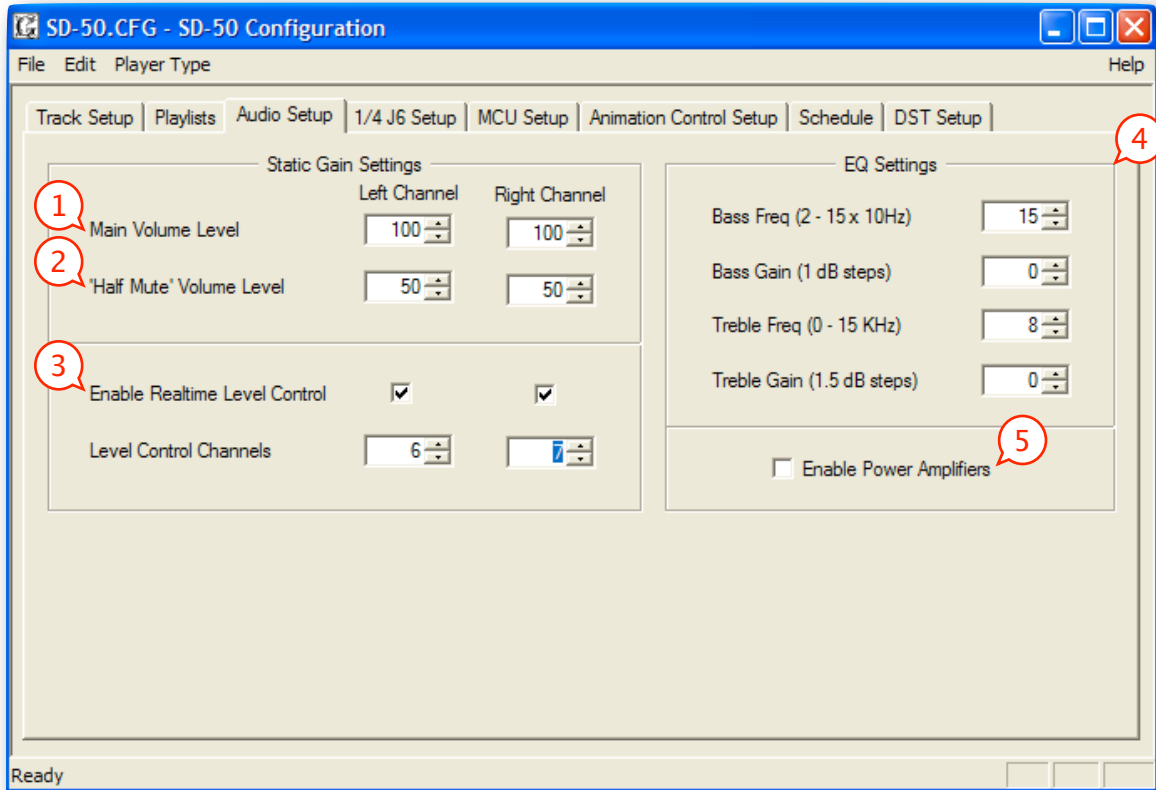
- 1) Select the list you are editing using any one of the eight radio buttons.
- 2) Move the SoundFiles you want in the list to the right column by selecting from among the audio tracks in the left column, and using the 'move selected tracks to PlayList' button.
- 3) Remember Last Track Played in this Playlist: If not checked, playlist 'play' commands will reshuffle the playlist when another playlist has been used. When checked, each playlist will remember the 'last' SoundFile played.
- 4) Rearrange the list if needed using the 'move up', 'move down' and 'delete' buttons.

You will note that the same SoundFiles can appear in the same playlist any number of times. This allows you to insert safety messages, advertisements, or other SoundFiles that you want to play more regularly than the other SoundFiles without actually wasting the capacity of the Sd flash card by storing multiple copies of the actual SoundFiles.

Audio Setup

(Sd-50/0, Sd-50/8, and Sd-50/40)

This tab is where you set the audio output levels for the **Sd-50/xx**. The volume control pots on the front of the **Sd-50/xx**'s is downstream of the electronic volume limits set inside the '**SdConfig.exe**' program. If either control is set too low, you will not be able to hear the audio from the **Sd-50/xx**.



1) Main Volume Level

This sets the maximum audio level for the two outputs from the **Sd-50/xx**. It controls both the line level outputs, and the on board amplifier's output levels.

The volume control pots on the front of the **Sd-50/xx**'s are downstream of the electronic volume limits set inside the '**SdConfig.exe**' program. This allows the volume to be adjusted to anywhere BELOW the limit set in the '**SdConfig.exe**' program using just a small screwdriver. In most applications, you will use the electronic volume limits set inside the '**SdConfig.exe**' program to set the MAXIMUM possible output from the **Sd-50/xx**'s to a level which is loud, but not so loud that it will destroy the speakers and other downstream gear.

This level is overridden if the **Sd-50/xx** has been set to use RealTime Level Controls from [DMX-512](#), [MIDI in](#), or Show Control data. Before any RealTime level information arrives, then this will use the 'Main Volume Level' for the outputs.

2) Half Mute

This sets the normal audio level for the two outputs from the **Sd-50/xx** when the unit has been told to 'Half Mute' its outputs. It controls both the line level outputs, and the on board amplifier's output levels. The 'Half Mute' level is generally used to duck the audio output to some reduced level during PA or mainte-

nance so that the audio plays at a more comfortable level. Although it is usually set to a level lower than the 'Main Volume Level', it can be set anywhere, including higher values.

If the **Sd-50/xx** has been set to use RealTime Level Controls from [DMX-512](#), [MIDI in](#), or Show Control data, then the 'half mute' level is scaled from whatever level these RealTime controls are setting as the 'full volume' levels.

3) RealTime Level Control

When enabled, Audio Levels can be controlled from:

- 1) [DMX-512](#) data received through the [DMX-512/MIDI serial port](#) (if DMX-512 reception is enabled).
- 2) RealTime Serial data received through the RS-232 serial port.
- 3) RealTime Serial data received through the [DMX-512/MIDI serial port](#) (if [Net Serial](#) is enabled).
- 4) MIDI data received through the [DMX-512/MIDI serial port](#) (if [MIDI in](#) is enabled, and 'MIDI notes trigger animation playback' is NOT selected).

In the first three cases above, the 'level Control Channels' set where the data for controlling the left and right outputs comes from. These can be set to different addresses, or the same address if you want a single analog channel to control both left and right outputs.

To control output levels when triggering SoundFiles from [MIDI in](#), the 'Note On' velocity is used. Note velocity values from 1 through 127 translate into audio levels 0-100%. If a SoundFile is started with a high 'Note On' velocity, it will play loudly. If it is started with a low velocity, it will play more softly.

4) EQ Settings

You should always try to adjust your EQ before recording your SoundFiles. This equalizer is used to make up for sins in the studio by allowing you to adjust the overall EQ of the **Sd-50/xx**.

5) Enable Power Amplifier

This is used to turn on and off the onboard power amplifier.

If you are not using the power amplifier, you should turn it off. The **Sd-50/xx** will run much cooler if the amplifier is turned off.

If you are using the onboard amplifier, you won't hear much coming out of it until you turn it ON.

To save power and reduce heating, the amplifier is turned off any time the **Sd-50/xx** is not playing a sound.

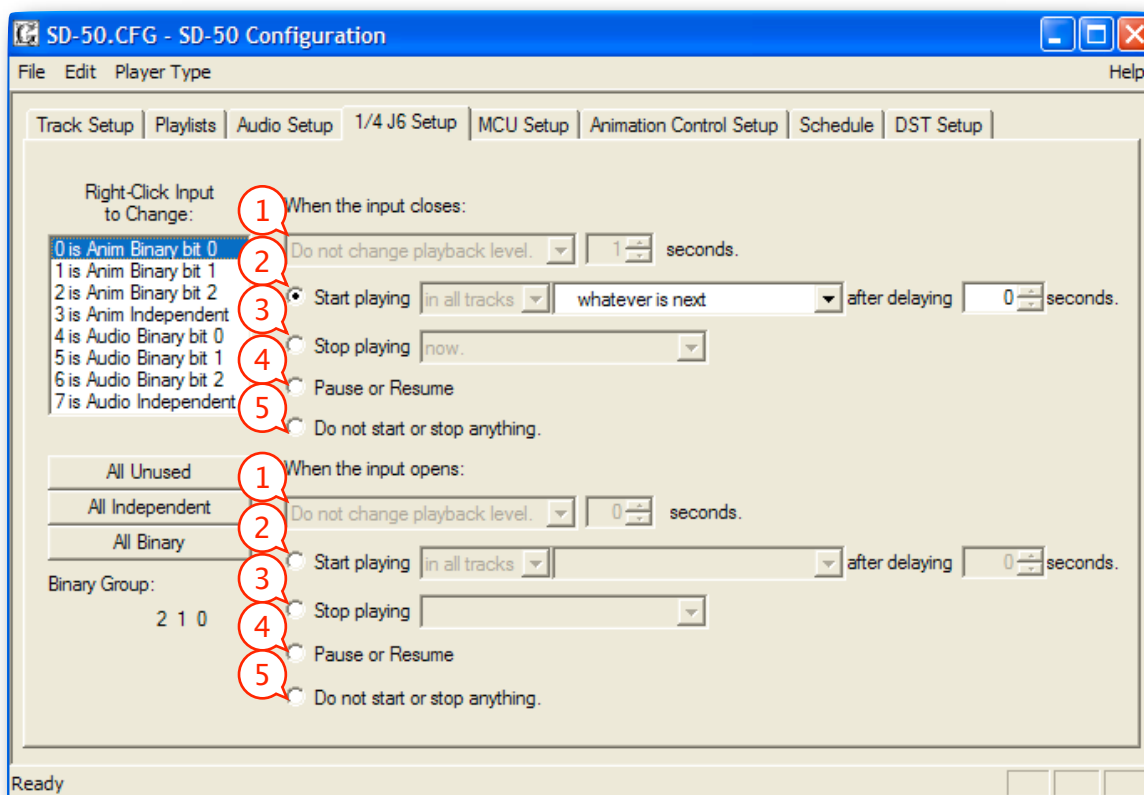
'¼ J6' Input Setup

(Sd-50/0, Sd-50/8, and Sd-50/40)

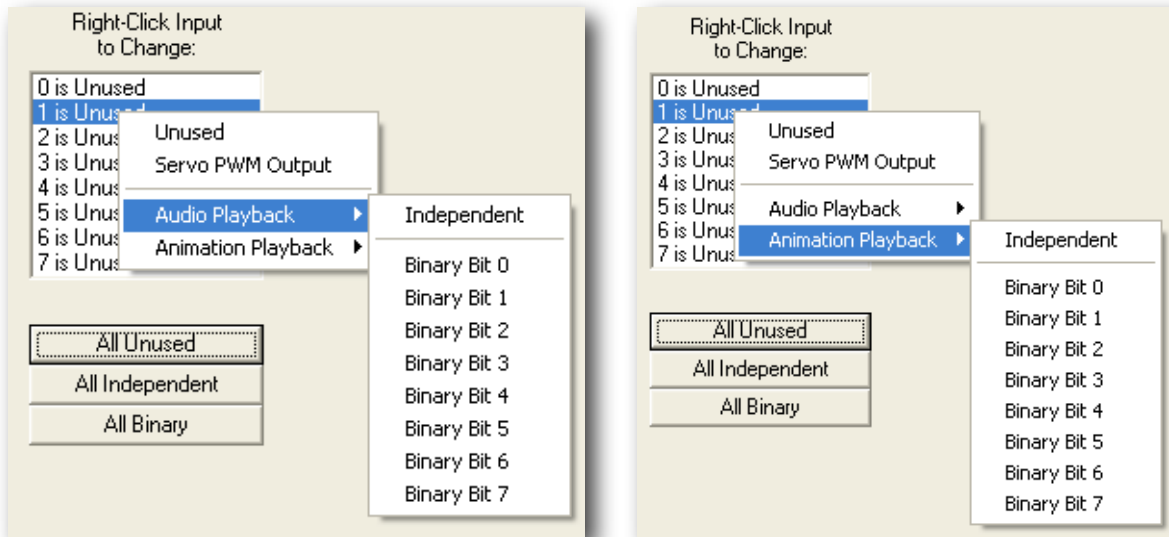
The **Sd-50/xx** has eight optically isolated trigger inputs on the '¼ J6' input on its end. These inputs can be used to trigger either sounds or shows. Binary patterns can be used to select and play up to 255 different shows or sounds, or they can be used to mute, half mute, unmute or pause and continue sounds and shows.

These are the inputs which are used for triggering **Sd-50/0s**.

On an **Sd-50/8** or **Sd-50/40**, these inputs are only rarely used as trigger inputs. In almost all cases when using an **Sd-50/8** or **Sd-50/40s**, you will set all of these inputs for 'Unused', and use the '[Animation 'Virtual' MCU Trigger](#)' for triggering audio. shared with eight of the Show Control outputs. These outputs can also be used for controlling up to eight model airplane-style PWM ServoMotors.



You can set any of the eight inputs as unused, an independent control, or part of a binary address. To set all the inputs to any of these modes, just use the 'All Unused', 'All Independent' or 'All Binary' buttons. To set the inputs independently, 'right'+click on the input you want to configure:



A Binary Select pattern can be used to directly access all possible 255 Show or SoundFiles which can be loaded onto an **Sd-50/xx**. If you are assigning inputs as part of a binary address, you should start by assigning 'bit #0'. It is on this input that you will be able to tell the **Sd-50/xx** to start, stop, or change volumes (fade in or out). The other inputs can then be assigned as binary bits '1', '2', '3' etc.. The number of bits used will determine how many Show and SoundFiles can be directly selected through the inputs:

# of binary bits used	Bits	# of Shows/SoundFiles
1	0 to 0	1 Show/SoundFile
2	0 to 1	3 Shows/SoundFiles
3	0 to 2	7 Shows/SoundFiles
4	0 to 3	15 Shows/SoundFiles
5	0 to 4	31 Shows/SoundFiles
6	0 to 5	63 Shows/SoundFiles
7	0 to 6	127 Shows/SoundFiles
8	0 to 7	255 Shows/SoundFiles

It is pointless to assign more bits than you have SoundFiles. i.e.: If you have twelve SoundFiles, don't assign any bits numbers above '3'.

When a group of inputs are acting as binary selects, any change in the inputs is considered a 'closing'. All the inputs going to 'zero' value simultaneously is considered an 'opening'. All opening and closing actions are configured by selecting 'Bit #0' for configuration.

Any input can be used as any bit number. You are not limited to assigning input '3' as 'bit #3' in the binary input pattern. This allows you to do miswire the inputs, and correct it in the configuration.

If you have fifteen or less Shows that you need to access through a binary pattern, use the **J8** inputs on the top of the **Sd-50/8** or **Sd-50/40** instead of the **¼ J6** inputs.

As a shortcut, buttons are available to quickly set the inputs as 'All unused', 'All Independent' or 'All Binary'. If any bits are assigned as binary bits, these will be shown below these buttons.

For each independent input, you can set a different action for the 'closing' edges (when power starts flowing through the optoisolators on the inputs) and 'opening' edges (when current stops lowing through the optoisolators).

Setting output channels to be used for Servo PWM is normally done automatically within the configuration that Pc•MACs creates during and AutoDownload. If you are doing this manually, start with bit0, and then switch consecutive bits to 'Servo PWM Output'.

1) Playback Level

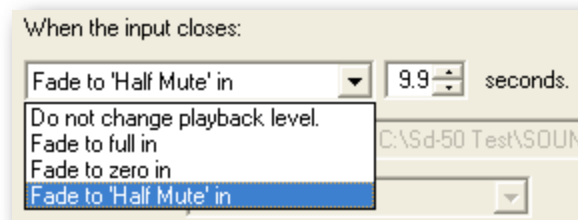
These options are not available if you are triggering a show with this input. This popup allows you to select a change in audio level on the outputs on this input/edge. This can be set for either the closing or opening edge. Your options are:

a) Do not change Playback Level

This option is not available if you are triggering a show with this input. This leaves the audio levels where they were before.

b) Fade to Full In

This option is not available if you are triggering a show with this input. This ramps the audio towards the 'full' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the [Audio Setup](#) tab, or by the RealTime level control, if this option has been selected.



c) Fade to Zero In

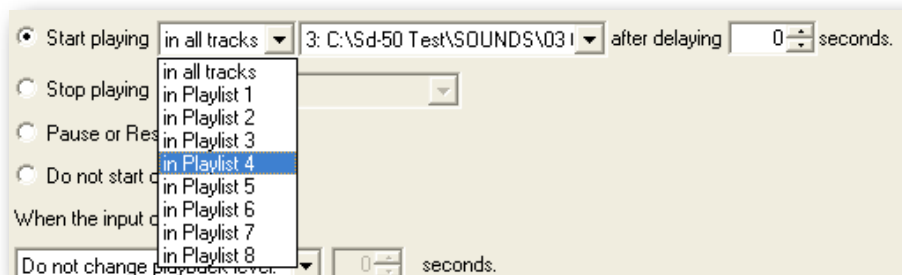
This option is not available if you are triggering a show with this input. This ramps the audio back towards the a fully muted level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds.

d) Fade to 'Half Mute' In

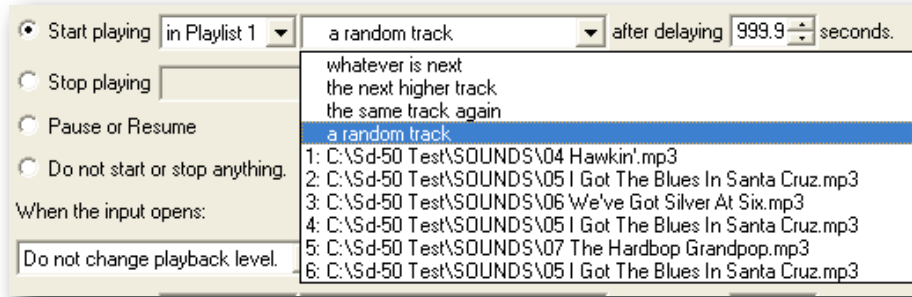
This option is not available if you are triggering a show with this input. This ramps the audio towards the level which has been set for the 'half muted' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the [Audio Setup](#) tab, or scaled from the RealTime level control, if this option has been selected.

2) Start Playing

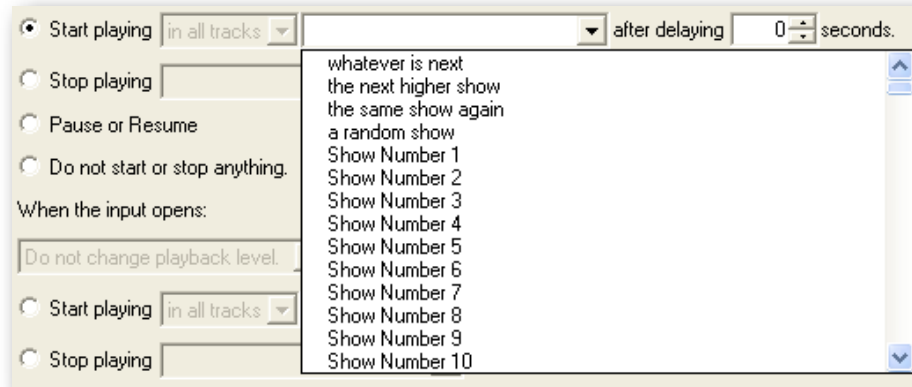
This series of popups allows you to select and play a Show or SoundFile on this input/edge. This can be set for either the closing or opening edge. The SoundFiles can be selected from among all of those on the Sd flash card, or from one of the eight PlayLists (*playlists are not available if you are triggering a show with this input.*):



Within the PlayList or Sd flash card you selected in the last step, you can select:



If you are triggering a show, the playlist popup is disabled and you can select:



e) Whatever is Next

This plays what the current/last SoundFile has set as the 'next' SoundFile to play at its end. This is set on the [Track Setup](#) tab. This selection ignores the 'on Sd flash card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

f) Next Higher Show or SoundFile

This plays the next Show or SoundFile sequentially. This Setting is used to play SoundFiles 'round robin'. You can choose if the next track will be selected from all the Shows or SoundFiles loaded on the player, or from one of the eight track lists. At the end of the list, the first track will be played again. As an option, you can delay the start of the Show or SoundFile from 0 to 999.9 seconds (16.65 minutes) before it plays.

g) The Same Show or SoundFile Again

The audio track which just played is started again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

h) A Random Show or SoundFile

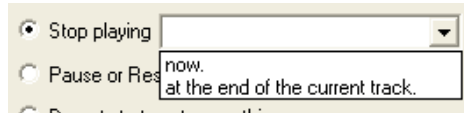
This plays a SoundFile picked at random from the entire card or one of the eight track lists. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

i) Specific Show or SoundFile

This selects and plays a specific Show or SoundFile. This selection ignores the 'on Sd flash card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

3) Stop Playing

This popup allows you to stop a SoundFile playing on this input/edge. This can be set for either the closing or opening edge.



Your options are:

a) Stop Now

This immediately stops any SoundFile playing this input/edge.

b) Stop at End

The current audio file plays through to its end normally. At the end of this SoundFile, the **Sd-50/xx** will stop and wait for the next command before it plays the next SoundFile. Any track which would have been played automatically will be ignored. This is used to stop a looping track gracefully. It can be combined with a fade out to stop an audio track without the abrupt cutoff that a **Stop Now** command would have.

4) Pause or Resume

Selecting this action will pause or resume the playback of a Show or SoundFile. This can be set for either the closing or opening edge.

5) Do not Start or Stop Anything

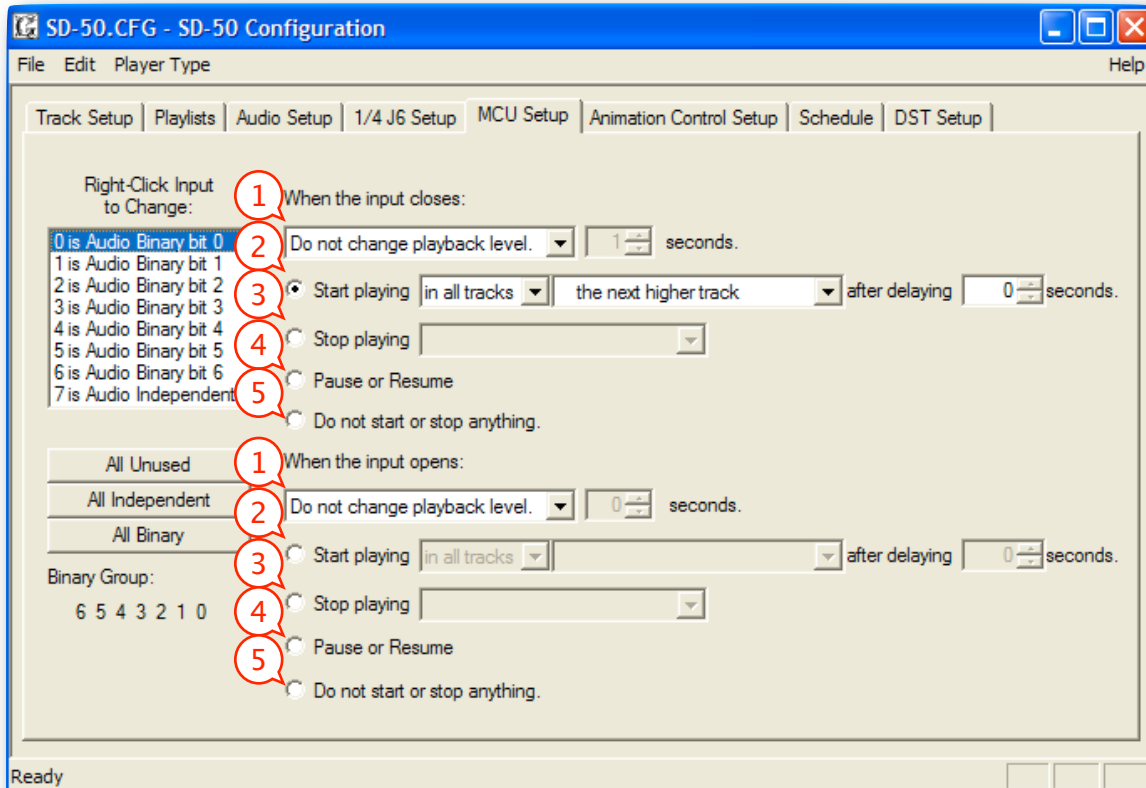
This input will have no effect on any Show or SoundFile. This can be set for either the closing or opening edge.

MCU Input Setup

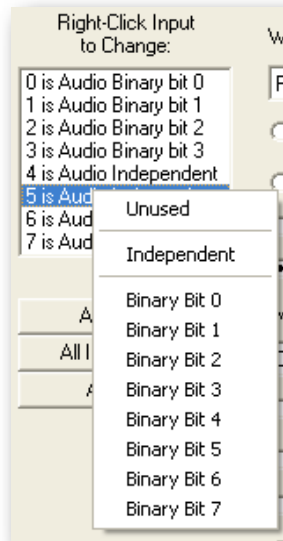
(Sd-50/8, and Sd-50/40)

This is **NOT** the port which triggers animation. This is the port that is used to trigger audio functions from the animation data. Animation is normally triggered via the 'J8' port, which is set up when AutoDownloading the shows from PC•MACs, or the ¼ J6 input, which is set up using the '**SdConfig.exe**' program's 'Input Setup' tab.

The **Sd-50/8** and **Sd-50/40** have eight Animation 'Virtual' MCU Trigger outputs which can be used to control the **.Mp3/.wav player**. In most cases when configuring an **Sd-50/8** and **Sd-50/40**, you will use these MCU show control outputs to control the **.Mp3/.wav player**. The '¼ J6' inputs will remain unused.



You can set any of the eight inputs as unused, an independent control, or part of a binary address. To set all the inputs to any of these modes, just use the 'All Unused', 'All Independent' or 'All Binary' buttons. To set the inputs independently, 'right'+click on the input you want to configure:



A Binary Select pattern can be used to directly access all possible 255 SoundFiles which can be loaded onto an **Sd-50/xx**. If you are assigning inputs as part of a binary address, you should start by assigning 'bit #0'. It is on this input that you will be able to tell the **Sd-50/xx** to start, stop, or change volumes (fade in or out). The other inputs can then be assigned as binary bits '1', '2', '3' etc.. The number of bits used will determine how many SoundFiles can be directly selected through the inputs:

# of binary bits used	Bits	# of SoundFiles
1	0 to 0	1 SoundFile
2	0 to 1	3 SoundFiles
3	0 to 2	7 SoundFiles
4	0 to 3	15 SoundFiles
5	0 to 4	31 SoundFiles
6	0 to 5	63 SoundFiles
7	0 to 6	127 SoundFiles
8	0 to 7	255 SoundFiles

It is pointless to assign more bits than you have SoundFiles. i.e.: If you have twelve SoundFiles, don't assign any bits numbers above '3'.

When a group of inputs are acting as binary selects, any change in the inputs is considered a 'closing'. All the inputs going to 'zero' value simultaneously is considered an 'opening'. All opening and closing actions are configured by selecting 'Bit #0' for configuration.

Any input can be used as any bit number. You are not limited to assigning input '3' as 'bit #3' in the binary input pattern. This allows you to do miswire the inputs, and correct it in the configuration.

As a shortcut, buttons are available to quickly set the inputs as 'All unused', 'All Independent' or 'All Binary'. If any bits are assigned as binary bits, these will be shown below these buttons.

For each independent input, you can set a different action for the 'closing' edges (when power starts flowing through the optoisolators on the inputs) and 'opening' edges (when current stops flowing through the optoisolators).

1) Playback Level

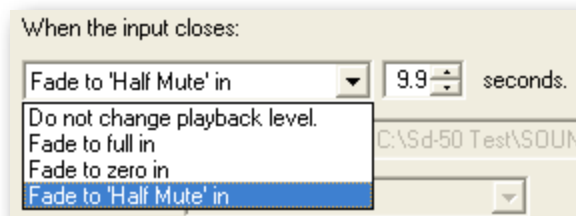
This popup allows you to select a change in audio level on the outputs on this input/edge. This can be set for either the closing or opening edge. Your options are:

a) Do not change Playback Level

This leaves the audio levels where they were before.

b) Fade to Full In

This ramps the audio towards the 'full' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the [Audio Setup](#) tab, or by the RealTime level control, if this option has been selected.



c) Fade to Zero In

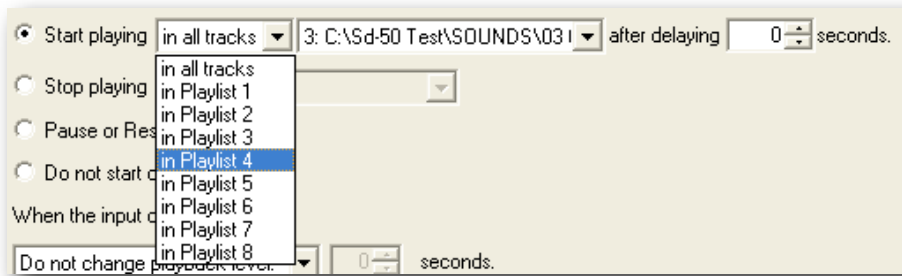
This ramps the audio back towards the a fully muted level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds.

d) Fade to 'Half Mute' In

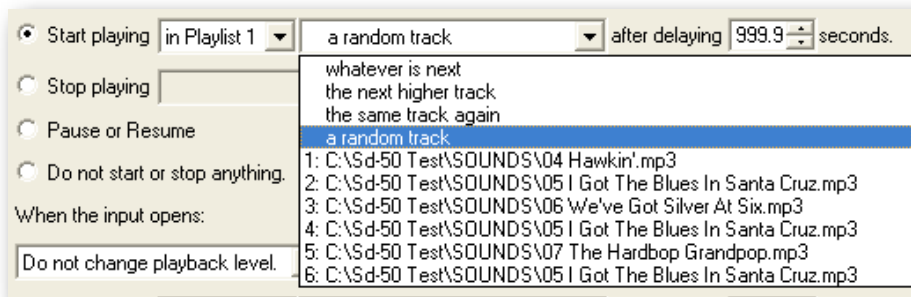
This ramps the audio towards the level which has been set for the 'half muted' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the [Audio Setup](#) tab, or scaled from the RealTime level control, if this option has been selected.

2) Start Playing

This series of popups allows you to select and play a SoundFile on this input/edge. This can be set for either the closing or opening edge. The SoundFiles can be selected from among all of those on the Sd flash card, or from one of the eight PlayLists:



Within the PlayList or Sd flash card you selected in the last step, you can select:



e) Whatever is Next

This plays what the current/last SoundFile has set as the 'next' SoundFile to play at its end. This is set on the [Track Setup](#) tab. This selection ignores the 'on Sd flash card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

f) Next Higher SoundFile

This plays the next SoundFile sequentially. This Setting is used to play SoundFiles 'round robin'. You can choose if the next track will be selected from all the SoundFiles loaded on the player, or from one of the eight track lists. At the end of the list, the first track will be played again. As an option, you can delay the start of the SoundFile from 0 to 999.9 seconds (16.65 minutes) before it plays.

g) The Same SoundFile Again

The audio track which just played is started again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

h) **A Random SoundFile**

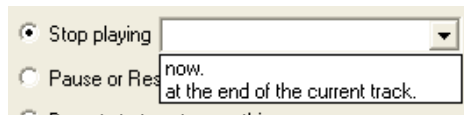
This plays a SoundFile picked at random from the entire card or one of the eight track lists. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

i) **Specific SoundFile**

This selects and plays a specific SoundFile. This selection ignores the 'on Sd flash card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

3) **Stop Playing**

This popup allows you to stop a SoundFile playing on this input/edge. This can be set for either the closing or opening edge.



Your options are:

a) **Stop Now**

This immediately stops any SoundFile playing this input/edge.

b) **Stop at End**

The current audio file plays through to its end normally. At the end of this SoundFile, the **Sd-50/xx** will stop and wait for the next command before it plays the next SoundFile. Any track which would have been played automatically will be ignored. This is used to stop a looping track gracefully. It can be combined with a fade out to stop an audio track without the abrupt cutoff that a **Stop Now** command would have.

4) **Pause or Resume**

Selecting this action will pause or resume the playback of a SoundFile. This can be set for either the closing or opening edge.

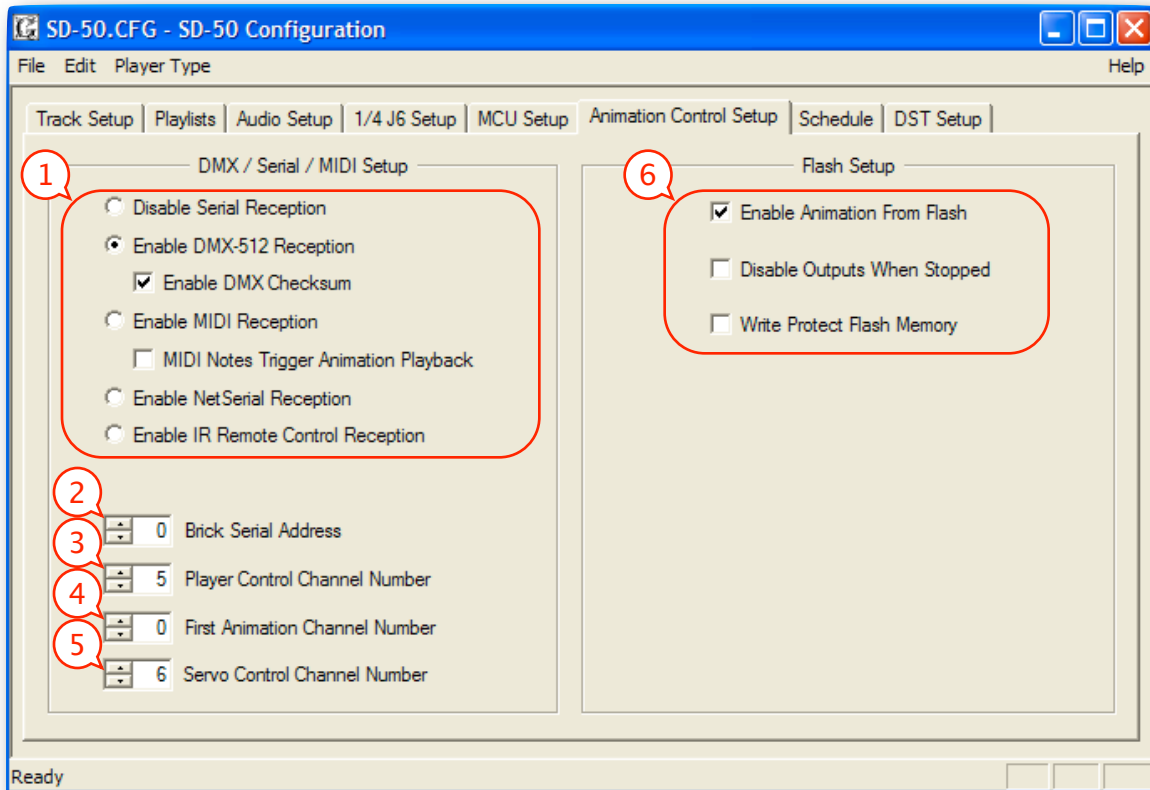
5) **Do not Start or Stop Anything**

This input will have no effect on any SoundFile. This can be set for either the closing or opening edge.

Animation Control Setup

(Sd-50/8, and Sd-50/40)

This window is used to setup:



1) DMX/MIDI/Serial Port Setup

The [DMX-512/MIDI serial port](#) can be set up to receive data in a variety of data formats, or disabled. The [DMX-512 serial port output](#) will always transmit DMX-512, no matter what type of data is being received.

a) Disable Serial Reception

Use this setting to completely disable [DMX-512](#), [MIDI in](#) or [Net Serial](#) data reception through **Sd-50/8** or **Sd-50/40** the serial port.

b) Enable DMX-512 Reception

Turning this mode on disables [MIDI in](#), [IR Trigger Mode](#) and [Net Serial](#) input on the [DMX-512/MIDI serial port](#).

When this mode is enabled, any valid DMX-512 will take over the **Sd-50/8** or **Sd-50/40**. The eight (**Sd-50/8**) or forty (**Sd-50/40**) Show Control outputs, ServoMotors, and audio volume and trigger control can all be controlled directly from the received DMX-512.

DMX-512, when enabled, has the highest priority of all inputs to the Show Control side of the **Sd-50/8** or **Sd-50/40**. DMX-512 arriving will override the Show data stored on the flash and serial RealTime updates.

If the DMX-512 signal drops out, the **Sd-50/8** or **Sd-50/40** will return to normal operations after a delay of about ten seconds.

If the DMX-512 received by the **Sd-50/8** or **Sd-50/40** contains the GilderChecksum in bytes 256 and 257, the unit will automatically lock to it. Once received, the **Sd-50/8** or **Sd-50/40** will continue to expect to

receive the GilderChecksum until it is reset. The GilderChecksum will keep the **Sd-50/8** or **Sd-50/40** from updating its outputs on any frame of data that has any errors in it.

Enable DMX-512 Checksums

When the **Enable DMX-512 Checksums** checkbox is enabled, DMX-512 will be transmitted with the GilderChecksum in bytes 256 and 257. These will keep any compatible GilderEquipment from updating their outputs if there is any error in the received DMX-512 data. If controlling any Gilderfluke & Company equipment, you should always keep the DMX-512 checksums enabled.

c) Enable MIDI Reception

Turning this mode on disables [DMX-512](#), [IR Trigger Mode](#) and [Net Serial](#) input on the [DMX-512/MIDI serial port](#).

This window is used to set the few settings for [MIDI in](#) reception through the [DMX-512/MIDI serial port](#). MIDI input has a lower priority than RealTime updates received through the RS-232 serial port. If the 'MIDI Notes Trigger Animation Playback' checkbox is OFF, then MIDI takes precedence over Show Control data stored in the Flash memory.

When this mode is enabled, any valid MIDI will take over the Show Control side of the **Sd-50/8** or **Sd-50/40**. Show Control outputs can be controlled, start and level control signals sent to the **.Mp3/.wav player** through the incoming MIDI.

If the MIDI signal drops out, the **Sd-50/8** or **Sd-50/40** will return to normal operations after a delay of about ten seconds.

MIDI Notes Trigger Animation Playback

MIDI has two different modes of operation on the **Sd-50/8** or **Sd-50/40**:

- 1) The first, selected if this checkbox is NOT checked, is used if you want to use the **Sd-50/8** or **Sd-50/40** as an output device wholly controlled by the MIDI coming in. Once a valid MIDI note has been received, the DMX/MIDI/Serial LED will light and stay lit until ten seconds after the MIDI has gone away. Starting with the first MIDI note set by the 'Animation First Note Number':
 - a) The first eight (for an **Sd-50/8**) or forty (**Sd-50/40**) MIDI notes are sent to the Show Control Outputs.
 - b) The next eight notes are sent to the 'MPU Control' Channel. These can be used to start and stop **.Mp3/.wav** player, and ramp the audio output between normal, muted and half muted levels.
 - c) The remaining notes are used to select SoundFiles on the **.Mp3/.wav** player directly. The first of these notes selects the first **.mp3/.wav** SoundFile, and so on. If RealTime Audio Level Controls have been enabled, the 'Note On' velocity is used to set the **.Mp3/.wav** player level. The MIDI 'Note On' velocity of 1 through 127 translates to volume levels from 0% through 100%.
 - d) Notes after the last SoundFile are ignored.
- 2) The second mode, selected when this checkbox has been checked, uses MIDI to trigger preprogrammed animated shows stored in the Show Control Flash memory. The shows are programmed normally, using PC•MACs, and downloaded to the **Sd-50/8** or **Sd-50/40** before this mode will work. Each time a show is started, the DMX/MIDI/Serial LED fill flash for an instant. Starting with the first MIDI note set by the 'Animation First Note Number':

- a) The very first 'Note' will trigger the Show Control side of the **Sd-50/8** or **Sd-50/40** with a 'whatever is next' show request. The 'Whatever is Next' is set for each show at the time the show files are downloaded from PC•MACs.
- b) Each note will trigger a specific animated show. Up to 127 shows can be accessed in this way.
- c) Show numbers beyond the last show loaded on the **Sd-50/8** or **Sd-50/40** are ignored.

MIDI Channel Number

A [MIDI in](#) data stream can be addressed to any of sixteen different addresses. These are typically set to choose which 'instrument' the data is being sent to. This sets which of these sixteen addresses the **Sd-50/8** or **Sd-50/40** will be sent to. Valid values are from 1 through 16. Potentially, up to sixteen **Sd-50/8** or **Sd-50/40** can be controlled on the same MIDI line.

MIDI First Note Number

Legal [MIDI in](#) notes are numbered from 00h through 7Fh (0 through 127 in decimal numbers). The only problem is that if you are actually using a keyboard to access the **Sd-50/8** or **Sd-50/40**, no keyboards actually have all 128 keys. A real piano has only 88. 'Middle C' is located at 3Ch (or 60 in decimal numbers) on all MIDI keyboards. You can count to the West and East of 'Middle C' to determine what numbers your keyboard will actually generate.

Numbers below the value you set for the 'MIDI Note Offset' will be ignored. If you wanted to start accessing the features of the **Sd-50/8** or **Sd-50/40** at 'Middle C', you would set this offset to 3Ch (or 60 in decimal numbers).

d) Net Serial Mode

Turning this mode on disables [DMX-512](#), [MIDI in](#) and [IR Trigger Mode](#) input on the [DMX-512/MIDI serial port](#).

This enables a mode which sets the DMX-512/MIDI serial port to 9600 baud and parallels the data received with that from the RS-232 serial port. This mode allows just about any number of **Sd-50/8** and **Sd-50/40s** to be controlled in parallel off the same RS-422 serial port.

All the standard serial port commands are valid through the Net Serial port. Since it is only a networked 'receive' port, you will not get any echoes or response through the DMX-512/MIDI out port. If you do attach a RS-232 serial terminal to the normal RS-232 serial port, you will see all responses and menus displayed there just as if the commands had come in through the RS-232 serial port.

At 9600 baud, the input can use the optoisolated or RS-422 switch settings for the DMX-512/MIDI ports.

e) IR Trigger Mode

Turning this mode on disables [DMX-512](#), [MIDI in](#) and [Net Serial](#) input on the [DMX-512/MIDI serial port](#). Data output from the DMX-512/MIDI serial port will be buffered and repeated, but otherwise an unaltered version of what is received on the input.

When this mode is enabled, it sets the DMX-512/MIDI port to 1200 baud, and listens for commands transmitted by the Gilderfluke & Company IR transmitter and receiver. The IR Remote is typically used to trigger an animation or sound system mounted on a vehicle, turntable, or other installation where wires can't be used.

The connections to the IR Remote Receiver are as follows (view is facing end of cable with latch up):

	NAME	COLOR	SIGNAL FUNCTION
LEFT	Ground	WHITE	Ground
	n/c	BLACK	no connection
	n/c	RED	no connection
	- TxD	GREEN	- DMX-512/MIDI Input
	+ TxD	YELLOW	+ DMX-512/MIDI Input
RIGHT	Ground	BLUE	Ground

In addition to these connections, the IR Receiver requires a seven to twenty-four volt DC (Direct Current) power supply connection. This is normally attached to the two pads marked “+” and “-” on the receiver. A jumper option allows you to bring this in through the blue wire on the RJ-11 connector.

The IR Transmitter has an eight position dipswitch which sets which show it selects. The lower nibble of the address is set with the first four switches, and the upper nibble is set with the last four. Valid show numbers are 01h through FFh:

Lower nibble of Address	Switch #1	Switch #2	Switch #3	Switch #4
x0h	OFF	OFF	OFF	OFF
x1h	ON	OFF	OFF	OFF
x2h	OFF	ON	OFF	OFF
x3h	ON	ON	OFF	OFF
x4h	OFF	OFF	ON	OFF
x5h	ON	OFF	ON	OFF
x6h	OFF	ON	ON	OFF
x7h	ON	ON	ON	OFF
x8h	OFF	OFF	OFF	ON
x9h	ON	OFF	OFF	ON
xAh	OFF	ON	OFF	ON
xBh	ON	ON	OFF	ON
xCh	OFF	OFF	ON	ON
xDh	ON	OFF	ON	ON
xEh	OFF	ON	ON	ON
xFh	ON	ON	ON	ON

Upper nibble of Address	Switch #5	Switch #6	Switch #7	Switch #8
0xh	OFF	OFF	OFF	OFF
1xh	ON	OFF	OFF	OFF
2xh	OFF	ON	OFF	OFF
3xh	ON	ON	OFF	OFF
4xh	OFF	OFF	ON	OFF
5xh	ON	OFF	ON	OFF
6xh	OFF	ON	ON	OFF
7xh	ON	ON	ON	OFF
8xh	OFF	OFF	OFF	ON
9xh	ON	OFF	OFF	ON
Axh	OFF	ON	OFF	ON
Bxh	ON	ON	OFF	ON

Upper nibble of Address	Switch #5	Switch #6	Switch #7	Switch #8
Cxh	OFF	OFF	ON	ON
Dxh	ON	OFF	ON	ON
Exh	OFF	ON	ON	ON
Fxh	ON	ON	ON	ON

When in this mode the 'EARLY STARTS' should be set to 'IGNORE' on all of your shows. Any binary show number received by the serial port for more than ten times will trigger that show. Typically the transmitters are placed along the path of the vehicle's travel to trigger the appropriate animation and audio sequences at the appropriate times.

2) Brick Address

This sets the serial address which will be used to access the **Sd-50/8** or **Sd-50/40** through the serial port. Although it is often set to the same addresses the First Animation Channel, it can be set to any value from 0 to 255. If more than one **Sd-50/8** or **Sd-50/40** is on the same serial port, they must all have unique addresses. When accessing the **Sd-50/8** or **Sd-50/40** through GilderTerm, this is the value you enter for the 'Card Address'.

3) Repeater MCU Control Channel

This sets the address of the data which will be sent from the Show Control side of the **Sd-50/8** or **Sd-50/40** to the 'virtual' port which is used to control the **.Mp3/wav player**. Valid address ranges are from 0-511 if 'DMX Checksums' are ON. Addresses from 1-512 can be used if 'DMX Checksums' are OFF.

4) First Animation Channel

This sets the address of the data which will be sent out the Show Control outputs. Valid address ranges are from 0-511 if 'DMX Checksums' are ON. Addresses from 1-512 can be used if 'DMX Checksums' are OFF.

On an **Sd-50/8**, the channel entered will be sent out the '[¼ J6](#)' port on the back of the unit.

On an **Sd-50/40**, the address entered will be sent out through channel '0' of the '[J6](#)' connector. The next four consecutive channels will be sent out through the remaining '[J6](#)' channels and the '[¼ J6](#)' output

5) First Servo Channel

This sets the address of the data which will be sent out the first ServoMotor output. Valid address ranges are from 0-511 if 'DMX Checksums' are ON. Addresses from 1-512 can be used if 'DMX Checksums' are OFF.

6) Flash Setup

The Flash memory on the **Sd-50/8** or **Sd-50/40** is used to store the Show Control data, schedules and GPS tables.

The Show Control data is normally output on the Show Control Outputs, MPU Control channel, Audio Level control channels, and [DMX-512 outputs](#). The show data is typically programmed using our **PC-MACs** software, and downloaded to the **Sd-50/8** or **Sd-50/40** through the RS-232 serial port or Sd flash card.

Although the flash memory has a capacity for 512 channels of data to be stored on it, this would limit your show capacity to about four minutes (at 30 updates per second). More typically, an **Sd-50/8** (without DMX-512 output) will need one or two channels of data stored on it. This will give a capacity of nineteen hours for show data storage in

the Flash memory (at 30 FPS). an **Sd-50/40** (without DMX-512 output) will need one to six channels of show data stored on it. This will give a capacity of over six hours for show data storage in the Flash memory (at 30 FPS). If you are using the DMX-512 outputs, this can add between one and 512 more channels of data that need to be stored, and will reduce the available capacity accordingly.

Enable Animation From Flash

This checkbox is normally left 'checked'. If it is unchecked, it will disable the playback of animation data from the Flash memory.

Disable Outputs When Stopped

This checkbox is normally left 'unchecked'. If it is checked, it will disable the Show Control outputs if there is no show running on the Show Control side of the **Sd-50/8** or **Sd-50/40**. This feature is used if there is a chance that a show will be stopped in the middle, and it may damage something that the **Sd-50/8** or **Sd-50/40** is controlling if the outputs are left on for an extended period of time.

Write Protect Flash Memory

This checkbox allows you to 'lock' the Show Control Flash memory against accidental erasure. If this is checked, then any downloads or writes to the flash will be ignored.

Schedule Setup

(Sd-50/8 or Sd-50/40)

The RealTime Clock is available on the **Sd-50/8s** and **Sd-50/40s**. The Real Time Clock chip provides the time of day and calendar information that is used to look in the schedule to see if there are any shows and SoundFiles that need to be played.

A small lithium [battery](#) keeps this clock running, even when the **Sd-50/8** or **Sd-50/40** is powered down for months. Even without the **GPS** kick, this RTC is laser trimmed for an accuracy rated at +5/-10 PPM. If the **Sd-50/8** or **Sd-50/40** is left unpowered for an extended period of time, it will run down the battery, and it may need to be replaced.

For greater accuracy, there a **GPS option**. This adds a commercially made GPS receiver to the **Sd-50/8** or **Sd-50/40**. The GPS option will work anywhere on the planet that receiver has a view of the sky. The GPS receivers are IPx7 rated for outdoor use, and are 'bulkhead' mounted using a single 5/8" diameter hole. The fifteen foot long cable from the GPS receiver plugs into a small GPS power module via a six pin mini-DIN connector. A three conductor cable with 2.5 mm stereo plugs at both ends is then connected between the power module and the **Sd-50/8** or **Sd-50/40**. The input to the **Sd-50/8** or **Sd-50/40** is optically isolated. You can stretch these wires for hundreds of feet, if needed.

The GPS, once it acquires a lock on the satellites orbiting overhead, takes over for the on-board Real Time Clock inside the **Sd-50/8** or **Sd-50/40**. Every 30 seconds, on the half minute, the GPS clock sets the RTC chip inside the **Sd-50/8** or **Sd-50/40**. This assures you that even if the GPS loses lock, the internal clock is set accurately.

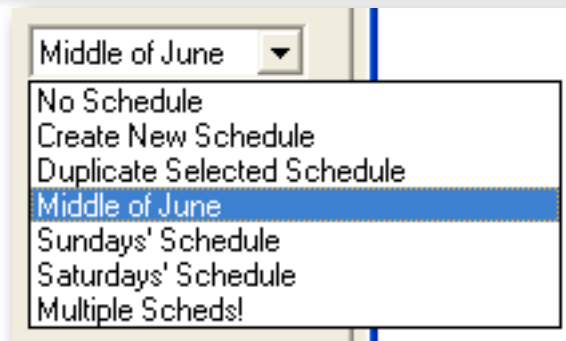
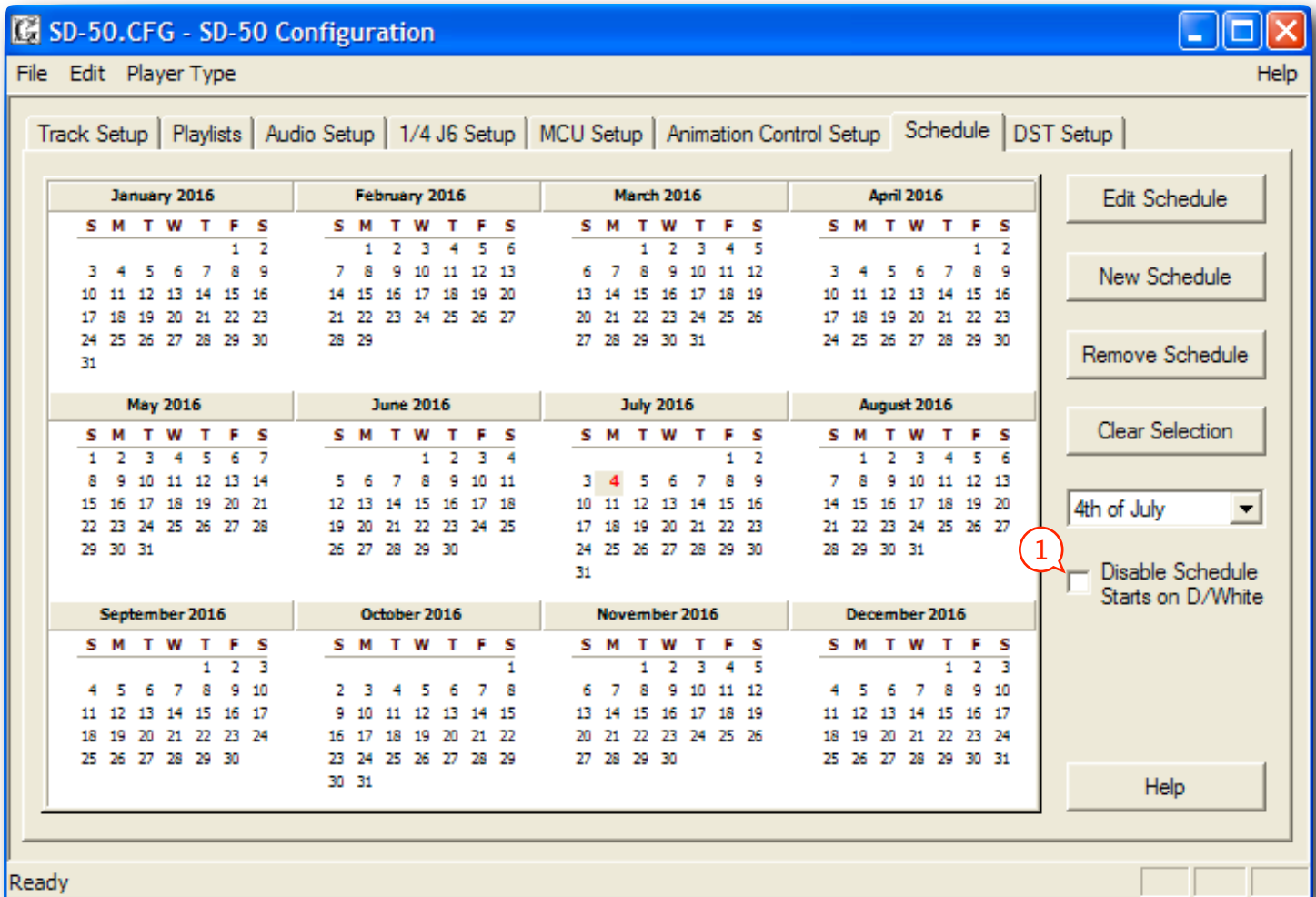
As with just about everything on an **Sd-50/8** or **Sd-50/40**, the configuration for the **365 day scheduling** is done through the '**SdConfig.exe**' or Pc•MACs Program. The main screen for configuring this option appears as a calendar. This is used to access the schedules you have set up. There can be up to 255 different schedules. Any schedule can be set to play on one or more day (any specific date of the year), or on one or more days of the week (DOWs = Sunday through Saturday).

Any schedule which is set to play on a specific day of the year will take precedence over a schedule which is set to play on a specific weekday. This allows you to set a schedule which plays Monday through Friday, but set a special holiday schedules for Christmas, Fourth of July, and Cinco de Mayo. etc.. This pattern of schedules will repeat year in and year out until the configuration is changed to do something else.

Specific days (dates) or days of the week (DOWs) can be selected by simply clicking on them. If you want to select a range of days, just click+drag or shift+click on any other day. The 'clear selection' button is used to deselect the date(s)/DOW(s).

In the example above, the 4th of July is selected, and a special schedule named '4th of July' will be run each year on this date.

In most cases, you will want to set most of your schedules to play using the DOWs, rather than specific dates. This allows you to set schedules which won't have to be reprogrammed each year. For example, for a school annunciator system, you will set the same schedule to play Monday through Friday for the months where school is in session. This same setup could play for years without modifications. If you were to select the specific days, all of these would need to be reprogrammed each year.

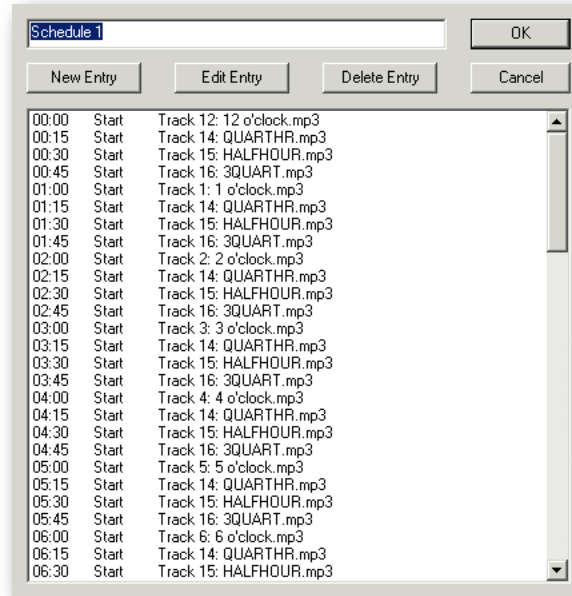


Once one or more date(s)/DOW(s) are selected, the popup at the right of the window will show the name of the schedule which is assigned to these date(s)/DOW(s), if there is one. If the selected date(s)/DOW(s) have been assigned to different schedules, 'multiple schedules' will be displayed in the popup. A schedule can be assigned to the selected date(s)/DOW(s) by popping up the list and selecting the desired schedule. You can also select 'none' to remove the schedule from the selected date(s)/DOW(s), or 'create new schedule' to create a new schedule and assign it to the selected date(s)/DOW(s), or 'duplicate schedule' to create a new schedule using the current schedule as a base and assign it to the selected date(s)/DOW(s). If you are changing the schedule assignment for any date(s)/DOW(s), then a confirmation dialog will be displayed.

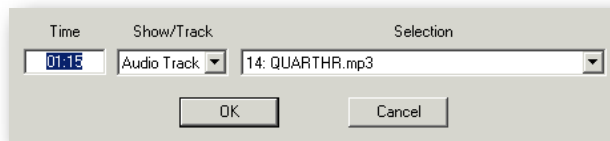
If a schedule is selected, but no date(s)/DOW(s) are selected, all the date(s)/DOW(s) which use this schedule will be highlighted.

Once a schedule is selected, you can use the 'edit' button to modify it. You can also double click on any date(s)/DOW(s) which has a schedule assigned to it to edit that schedule. The following schedule shows the Westminster chimes on each quarter hour, with tolls on the full hours.

You can name any schedule anything you wish. This will be displayed on the main menu of the **Sd-50/8** or **Sd-50/40**. Buttons are available to add a 'new entry', 'edit' and existing entry, or 'delete' an existing entry. Double clicking on any existing entry will also open it for editing.



The following simple dialog is used to enter or edit any schedule entry. The time is entered in hours and minutes (time is entered in '24 hour' 'military' time). As you are typing it in, you can use a space in place of the ':'. You have the choice of starting any specific audio track or show at the time selected. You can also select sequentially or randomly from one of the Audio playlists, and then the playlist you wish to use.



1) Disable Schedule Starts on 'D'/White Input

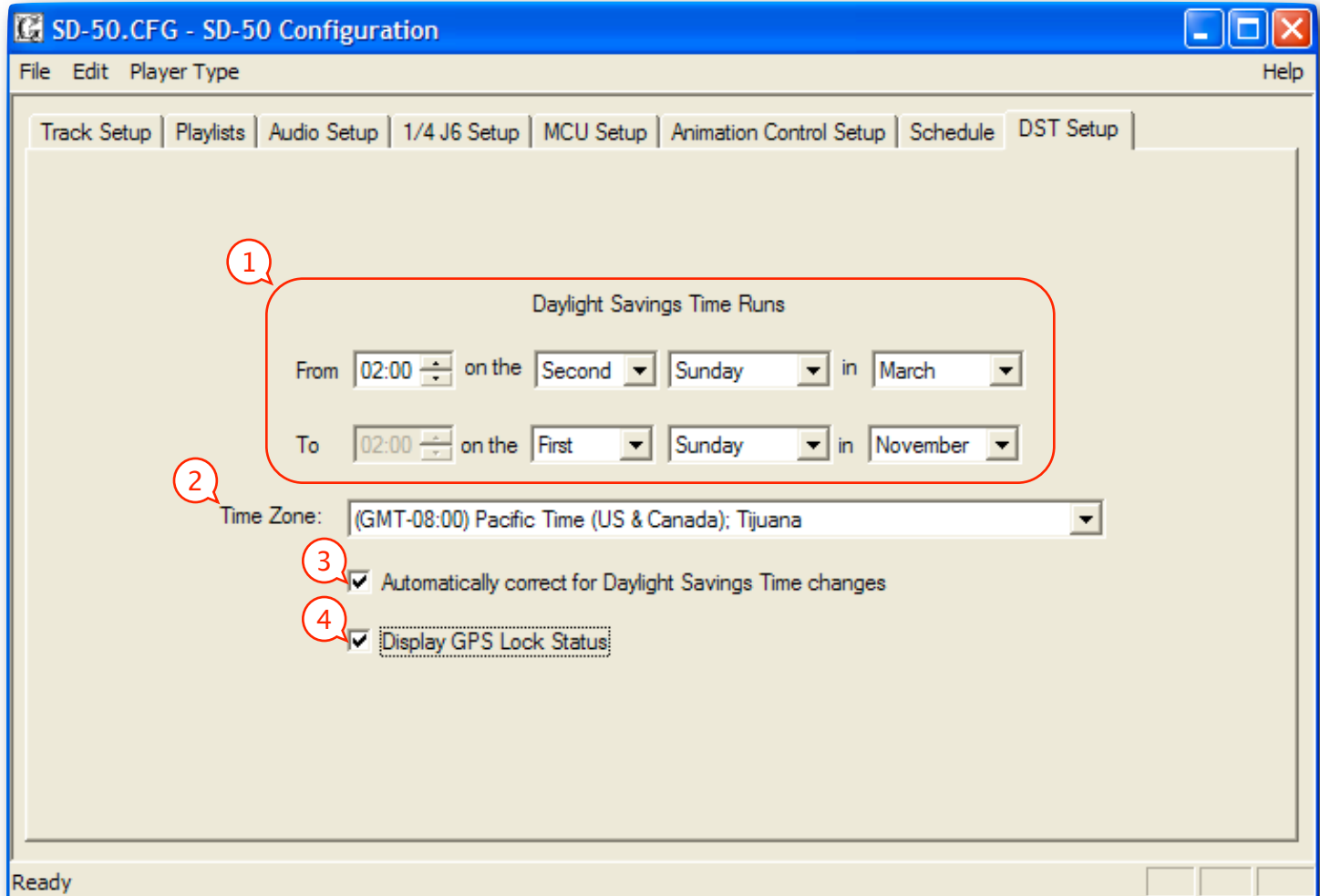
This input can be used to disable scans of the RTC schedules when the input is **opened**. This can be used to stop sounds from playing automatically when they shouldn't. Examples of where this feature can be used are:

- In a church bell tower, where a simple switch closure can be used to temporarily disable bells from ringing during a service.
- In a Theme Park or museum, where this input can be tied to the existing power management grid to disable scheduled shows when the attraction is closed.
- If you have a show or sound which should not be interrupted by a scheduled event, or if schedule scans are causing glitches in your show playback. You can set the show/sound so that it 'can not' be stepped on, but if you have a particularly long schedule that must be scanned, it may cause a hesitation in the show which is running. By using a show control output wired into this input, you can control when schedule scans can and can not take place during different parts of the show.

Daylight Savings Time & Time Zone Setup

(Sd-50/8 or Sd-50/40)

The final tab in the 'SdConfig.exe' program is used to set a few options for the Real Time Clock and GPS:



1) Daylight Savings Time

Here you can set the starting and ending schedule for your local Daylight Settings Time. The defaults are the dates and times used in the United States of America. If you happen to live in the Southern Hemisphere, Just set your local DST settings here. The settings will work anywhere in the world.

2) Time Zone

The time that arrives from the GPS receiver, and the time that is stored in the Real Time Clock chip are all 'Greenwich Mean Time'. To display your local time, the **Sd-50/8** or **Sd-50/40** must know what time zone is in use. If you are distributing your shows across several time zones, this is the only setting that needs to be changed to accommodate where the **Sd-50/8** or **Sd-50/40** is to be located.

3) Automatically Correct for Daylight Savings Time Changes

This allows you to enable or disable support for Daylight Settings Time. This settings defaults 'ON', but you can turn it off if the **Sd-50/8** or **Sd-50/40** is to be located in Arizona, or another location which doesn't use Daylight Settings Time.

4) Display GPS Lock Status

When this is checked, bit7 of the ¼ J6 output is taken over as a status indicator for the locked status of the GPS receiver. If the GPS is locked to the satellites overhead, then this output will flash at a steady rate. If the GPS antenna loses contact with the satellites, then this output will stop flashing.

Sd-50/0, Sd-50/8, and Sd-50/40 Installation

The **Sd-50/xx** can be mounted using four screws; a pair of DIN rail adapters; 2-3/4" Augat 'Snap-Track' (which itself can be DIN rail mounted using DIN rail adapters); or just Velcro'd down.

In many applications, the **Sd-50/xx** can be attached on (or in) the show or display it is controlling. The **Sd-50/xx** must not be mounted where it might get wet, or suffer from extremes of temperature.

Unless the amplifier is being run at extreme output levels, the **Sd-50/xx** will generate very little heat. Attaching it to something metal will allow it to dissipate what little heat it does generate.

If you are not using the amplifier, turn it off in the '**SdConfig.exe**' program. The **Sd-50/xx** will generate less heat that way.

Battery Replacement on an Sd-50/8 or Sd-50/40

(Sd-50/8 or Sd-50/40)

A small lithium battery keeps the internal Real Time Clock chip running, even when the **Sd-50/8** or **Sd-50/40** is powered down for months. When plugged in, the battery is unused. If the **Sd-50/8** or **Sd-50/40** is left unpowered for an extended period of time, it will discharge the battery, and the battery may need to be replaced.

If you are not using the Real Time Clock for scheduling when shows and sounds play, it does not matter if the battery dies. It is not being used anyway. It just means that the time will be incorrect if you ever look at the [serial menus](#) or request the [status](#) from the **Sd-50/8** or **Sd-50/40**.

To replace the battery:

- 1) Power down the **Sd-50/xx**.
- 2) Remove the Sd flash card from the **Sd-50/8** or **Sd-50/40**.
- 3) Unscrew the two 4-40 x 1/2" screws that hold the connector paddleboard in place.
- 4) Remove the paddleboard.
- 5) Lift the paddleboard end of the upper part of the case straight up away from the bottom of the unit. Do not separate the parts too far. You are just unplugging the connectors that go between the top and bottom of the **Sd-50/xx**.
- 6) When the connectors that go between the top and bottom of the **Sd-50/xx** disengage, slide the top of the case forward towards the Sd flash card end of the player. This releases them from the RS-232 and RTC connectors where they pass through the case top.
- 7) Once the RS-232 and RTC connectors are free from the case top, you can separate the top from the bottom of the **Sd-50/8** or **Sd-50/40** completely.
- 8) The battery is now exposed on the bottom of the top piece. The battery is either one or two BR1225s, which are 12.5 mm diameter, Lithium coin cells rated at 3.0 volts at 48 mAh or a pair of CR2032 Lithium coin cells rated at 3v for 225mAh.

Once the batteries are replaced, the **Sd-50/xx** is reassembled in the reverse order from which it was disassembled:

- 1) Keep the top and bottom pieces slightly separated at the paddle board end of the case. Slide the case top over the front of the RS-232 and RTC connectors at the Sd end of the **Sd-50/xx**.
- 2) Close the case at the paddleboard end to plug together the connectors that go between the top and bottom of the **Sd-50/xx**. Make sure that all of the pins engage on these two connectors. A pin which misses its mark will cause the **Sd-50/xx** to not work properly.
- 3) Plug the paddleboard into the unit.
- 4) Screw in the two 4-40 x 1/2" screws that hold the connector paddleboard in place.

If the batter had been allowed to die, the Real Time Clock will need to be set after replacing the battery. If the battery still had some life in it and your worked quickly, the RTC may have retained the time.

The same Disassembly/Reassembly instructions should be followed if any of the socked chips inside the **Sd-50/xx** should ever need to be replaced.

Care & Feeding of an GPS Receiver

(Sd-50/GPS8 or Sd-50/GPS40)

The GPS option adds a commercially made GPS receiver to the **Sd-50/8** or **Sd-50/40**. The GPS option will work anywhere on the planet.

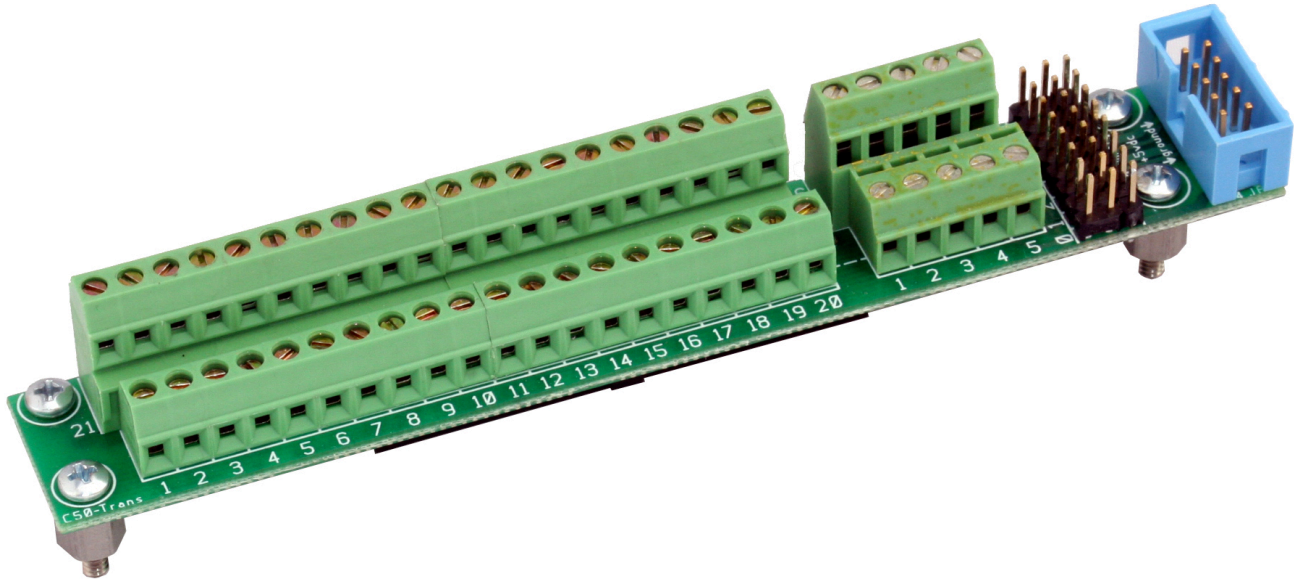
The receiver is mounted anywhere where it has a view of the sky. The GPS receivers are IPx7 rated for outdoor use, and are 'bulkhead' mounted using a single 5/8" diameter hole.

The fifteen foot long cable from the GPS receiver plugs into a small GPS power module via a six pin mini-DIN connector. A three conductor cable with 2.5 mm stereo plugs at both ends is then connected between the power module and the **Sd-50/8** or **Sd-50/40**.

The input to the **Sd-50/8** or **Sd-50/40** is optically isolated. You can stretch these wires for hundreds of feet, if needed.

C-50Trans Transition Connector

(Sd-50/40)



The **C-50Trans** is a convenient way to attach discrete wires to an **Sd-50/xx** for the forty digital (on/off) Show Control Outputs. It attaches right to the back of an **Sd-50/40**. It also provides convenient connections for up to eight model airplane-style PWM ServoMotors.

You install a **C-50Trans** by:

- 1) Locating the threaded mounting holes in the case top of the **Sd-50/40**. Position the **C-50Trans** on the top of the case by plugging it into the forty position '[J6](#)' connector. It has a polarizing 'bump' on one side, so it will only go in the correct way. Use a pin or other pointy object to poke a hole through the **Sd-50/40's** label at each of the four mounting holes. Remove the **C-50Trans** from the **Sd-50/40**. Use an X-acto or other sharply pointed knife to remove the label where it covers the threaded hole beneath. You only need to expose the hole. No additional label material around the hole should be removed. Be careful not to damage the threads as you remove the label.
- 2) Install the four 4-40 x 1/4" tall male/female spacers into the four mounting holes in the top of the **Sd-50/40**. To make them the required 5/16" tall, install two 1/32" thick washers under each standoff before you screw it down.
- 3) Plug the **C-50Trans** into the **Sd-50/40**. It has a polarizing 'bump' on one side, so it will only go in the correct way.
- 4) Screw the **C-50Trans** down using the four 4-40 x 1/4" screws.
- 5) The ten position ribbon cable plugs into the '[1/4 J6](#)' connector on the end of the **Sd-50/40**.

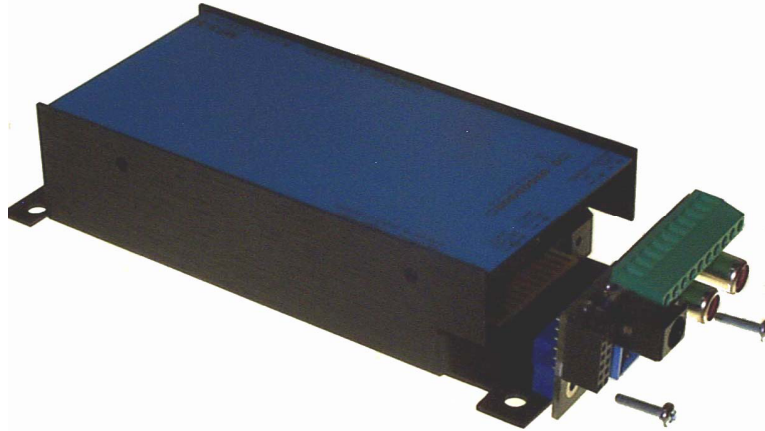
You can now terminate discrete wires into the **C-50Trans**. If you are attaching ServoMotors, just switch the '[1/4 J6](#)' Internal/External Power to the 'External' power position. Attach your ServoMotors' Five vdc supply to screw terminals #1 (ground) and #10 (+5 vdc) of the '[1/4 J6](#)' screw terminal block. Plug the servos into the headers and configure the appropriate outputs for ServoMotor PWM control.

Sd-50/CC-10 Card Cage

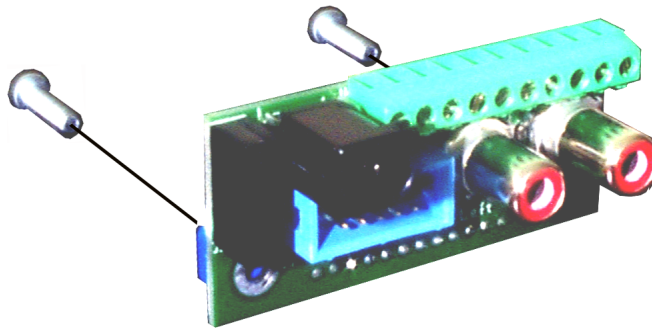
(Sd-50/0 (or with restrictions Sd-50/8 or Sd-50/40))

The **Sd-50/CC-10** is a card cage designed to hold up to ten **Sd-50/0s** in 2U (3-1/2") of standard 19" rack space. The **Sd-50/CC-10** can also be used with **Sd-50/8** or **Sd-50/40**, but there is no space between the cards for the animation trigger inputs or Show Control Outputs (**Sd-50/40** only). In most cases, you will have to leave every slot adjacent to an **Sd-50/8** or **Sd-50/40** vacant.

Once installed in an **Sd-50/CC-10**, the [DMX-512/MIDI serial ports](#) on **Sd-50/8** or **Sd-50/40** cards are all daisy chained together. These serial ports can be used for [DMX-512](#), [Net Serial](#), [IR Trigger Mode](#) or [MIDI in](#) input to **Sd-50/8** or **Sd-50/40** cards. **Sd-50s** do not include the DMX-512/MIDI serial port.



Sd-50/xx cards are installed in an **Sd-50/CC-10** by first removing the two screws which hold the connector card to the end of the **Sd-50**. The connector card at the end of the **Sd-50/xx** is then removed to be installed in the **Sd-50/CC-10**.



The same two screws which you removed are inserted through the same holes through the connector card of the **Sd-50/0**, but going the opposite direction. These two screws are then used to hold the connector card into the **Sd-50/CC-10** (the cards and the screws are installed through the front of the cage). As the connector card is plugged in to the backplane, confirm that all twelve pins of J2 are inserted correctly into the mating connector on the backplane of the **Sd-50/CC-10**.



Now the **Sd-50/xx** can be plugged into the card cage. Nothing else needs to be removed or changed on the **Sd-50/xx** before they are inserted into the **Sd-50/CC-10**.



Power can be wired into any of the card cage positions, or through the heavy current screw terminals. The latter should be used if you are using the amplifiers or Show Control outputs on **Sd-50/8** or **Sd-50/40** cards. This is because the total current draw can exceed the capacity of the 2.1 mm power connector or smaller screw terminals located on the back of each **Sd-50**.

The [DMX-512](#) serial port can be daisy chained from higher numbered slots towards lower number slots, but it is better just to parallel them. Each **Sd-50/xx** will add a slight delay in the DMX-512 data, which may be unacceptable by the time you reach the end of the cage.

If you are daisy chaining DMX-512, the **Sd-50/xx** that receives the initial DMX-512 connection can be set for isolated or RS-422 operation. All the subsequent cards should be set for RS-422 operation. The signal is wired into the highest numbered populated slot and will be daisy chained through all the adjacent lower numbered slots. If a single slot is left unpopulated, or populated with an **Sd-50/0**, will break the daisy chain. This can be used to divide the backplane into two or more universes.

An **Sd-50/xx** can be converted back to stand-alone use by simply reversing the installation process. Remove the two screws which hold the connector card into the **Sd-50/CC-10**, Plug it back into the **Sd-50/xx**, and secure it with the two screws.

FCC and CE Compliance:

Sd-50s, **Sd-50/8** and **Sd-50/40** which are hardware revision 1.0 or later have been tested to comply with FCC and CE requirements. Revisions earlier than this may have passed testing, but were not certified at the time of manufacture.

Because **Sd-50s**, **Sd-50/8** and **Sd-50/40** are low voltage DC devices, neither UL or CE require safety testing.

For fireproofing or additional radio frequency interference shielding, **Sd-50s**, **Sd-50/8** and **Sd-50/40** can be mounted in a fire rated metallic case. Typically, this would be a NEMA-rated electrical enclosure or 19" electrical rack.

FCC Instruction to User:

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment has been verified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EC DECLARATION OF CONFORMITY

Friday, January 15, 2016

Application of Council Directives:

EMC Directive, 89/336/EEC

Manufacturer's Name:

Gilderfluke & Co., Inc.

Manufacturer's Address:

205 South Flower St., Burbank, California 91502 USA

Importer's Name:

Importer's Address:

Type of Equipment:

Entertainment and Lighting Control

Equipment Class:

Commercial and Light Industrial

Model:

Sd-50, Sd-50/8, Sd-50/40

Conforms to the following Standards:

EN 55103-1: 1996 and EN 55103-2: 1996

Year of Manufacture:

2006

I the undersigned, hereby declare that the equipment specified above conforms to the above directive(s) and standard(s).

Place: Burbank, California

Signature: (signed) _____

Date: August 1, 2006

Full Name: Doug Mobley

Position: CEO

HEXadecimal to Decimal to ASCII to Percentage

This 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	00h	null	0%	64	40h	@	25%	128	80h	(null)	50%	192	C0h	(@)	75%
1	01h	soh/^A		65	41h	A		129	81h	(soh)		193	C1h	(A)	
2	02h	stx/^B		66	42h	B		130	82h	(stx)		194	C2h	(B)	
3	03h	etx/^C		67	43h	C		131	83h	(etx/)		195	C3h	(C)	
4	04h	eot/^D		68	44h	D		132	84h	(eot)		196	C4h	(D)	
5	05h	eng/^E		69	45h	E		133	85h	(eng)		197	C5h	(E)	
6	06h	ack/^F		70	46h	F		134	86h	(ack)		198	C6h	(F)	
7	07h	bell/^G		71	47h	G		135	87h	(bell)		199	C7h	(G)	
8	08h	bs/^H		72	48h	H		136	88h	(bs)		200	C8h	(H)	
9	09h	ht/^I		73	49h	I		137	89h	(ht)		201	C9h	(I)	
10	0Ah	lf/^J		74	4Ah	J		138	8Ah	(lf)		202	CAh	(J)	
11	0Bh	vt/^K		75	4Bh	K		139	8Bh	(vt)		203	CBh	(K)	
12	0Ch	ff/^L		76	4Ch	L		140	8Ch	(ff)		204	CCh	(L)	
13	0Dh	cr/^M		77	4Dh	M		141	8Dh	(cr)		205	CDh	(M)	
14	0Eh	so/^N		78	4Eh	N		142	8Eh	(so)		206	CEh	(N)	
15	0Fh	si/^O		79	4Fh	O		143	8Fh	(si)		207	CFh	(O)	
16	10h	dle/^P		80	50h	P		144	90h	(dls)		208	D0h	(P)	
17	11h	dc1/^Q		81	51h	Q		145	91h	(dc1)		209	D1h	(Q)	
18	12h	dc2/^R		82	52h	R		146	92h	(dc2)		210	D2h	(R)	
19	13h	dc3/^S		83	53h	S		147	93h	(dc3)		211	D3h	(S)	
20	14h	dc4/^T		84	54h	T		148	94h	(dc4)		212	D4h	(T)	
21	15h	nak/^U		85	55h	U		149	95h	(nak)		213	D5h	(U)	
22	16h	syn/^V		86	56h	V		150	96h	(syn)		214	D6h	(V)	
23	17h	etb/^W		87	57h	W		151	97h	(etb)		215	D7h	(W)	
24	18h	can/^X		88	58h	X		152	98h	(can)		216	D8h	(X)	
25	19h	em/^Y		89	59h	Y		153	99h	(em)		217	D9h	(Y)	
26	1Ah	sub/^Z		90	5Ah	Z		154	9Ah	(sub)		218	DAh	(Z)	
27	1Bh	ESC		91	5Bh	[		155	9Bh	(ESC)		219	DBh	([)	
28	1Ch	FS		92	5Ch	\		156	9Ch	(FS)		220	DCh	(\)	
29	1Dh	GS		93	5Dh	]		157	9Dh	(GS)		221	DDh	(])	
30	1Eh	RS		94	5Eh	^		158	9Eh	(RS)		222	DEh	(^)	
31	1Fh	VS		95	5Fh	`		159	9Fh	(VS)		223	DFh	(`)	
32	20h	SP	12.5%	96	60h	´	37.5%	160	A0h	(SP)	62.5%	224	E0h	(´)	87.5%
33	21h	!		97	61h	a		161	A1h	(!)		225	E1h	(a)	
34	22h	"		98	62h	b		162	A2h	(")		226	E2h	(b)	
35	23h	#		99	63h	c		163	A3h	(#)		227	E3h	(c)	
36	24h	\$		100	64h	d		164	A4h	(\$)		228	E4h	(d)	
37	25h	%		101	65h	e		165	A5h	(%)		229	E5h	(e)	
38	26h	&		102	66h	f		166	A6h	(&)		230	E6h	(f)	
39	27h	'		103	67h	g		167	A7h	(')		231	E7h	(g)	
40	28h	(		104	68h	h		168	A8h	(())		232	E8h	(h)	
41	29h	)		105	69h	i		169	A9h	(i)		233	E9h	(i)	
42	2Ah	*		106	6Ah	j		170	AAh	(*)		234	EAh	(j)	
43	2Bh	+		107	6Bh	k		171	ABh	(+)		235	EBh	(k)	
44	2Ch	,		108	6Ch	l		172	ACH	(,)		236	ECh	(l)	
45	2Dh	-		109	6Dh	m		173	ADh	(-)		237	EDh	(m)	
46	2Eh	.		110	6Eh	n		174	A Eh	(.)		238	EEh	(n)	
47	2Fh	/		111	6Fh	o		175	AFh	(/)		239	EFh	(o)	
48	30h	0		112	70h	p		176	B0h	(0)		240	F0h	(p)	
49	31h	1		113	71h	q		177	B1h	(1)		241	F1h	(q)	
50	32h	2		114	72h	r		178	B2h	(2)		242	F2h	(r)	
51	33h	3		115	73h	s		179	B3h	(3)		243	F3h	(s)	
52	34h	4		116	74h	t		180	B4h	(4)		244	F4h	(t)	
53	35h	5		117	75h	u		181	B5h	(5)		245	F5h	(u)	
54	36h	6		118	76h	v		182	B6h	(6)		246	F6h	(v)	
55	37h	7		119	77h	w		183	B7h	(7)		247	F7h	(w)	
56	38h	8		120	78h	x		184	B8h	(8)		248	F8h	(x)	
57	39h	9		121	79h	y		185	B9h	(9)		249	F9h	(y)	
58	3Ah	:		122	7Ah	z		186	BAh	(:)		250	FAh	(z)	
59	3Bh	;		123	7Bh			187	BBh	(;)		251	FBh	(;)	
60	3Ch	<		124	7Ch			188	BCh	(<)		252	FCh	(<)	
61	3Dh	=		125	7Dh	l		189	BDh	(=)		253	FDh	(l)	
62	3Eh	>		126	7Eh	~		190	BEh	(>)		254	FEh	(~)	
63	3Fh	?		127	7Fh	del		191	BFh	(/)		255	FFh	(del)	100%