Overview: MIDIWizard and the DigiTech GSP-2101 Interface

The GSP-2101 Artist Owner's Manual

MIDIWizard's on-line help makes frequent reference to page numbers in the GSP-2101 Artist Owner's Manual. If you don't have a copy of this manual, it's available for downloading as a PDF file from the following web site:

http://www.tube-tester.com/sites/gsp2101/dat/GSP2101manual.pdf

Hooking Up Your GSP-2101 to Your Computer

Older desktop computers come equipped with a game port and a set of pre-installed MIDI device drivers. If yours is one of these, all you need to hook your GSP-2101 up to your computer is a special cable that adapts the game port to a pair of MIDI plugs, one for MIDI In and the other for MIDI Out.

Newer computers, including laptops, require the purchase of a separate MIDI hardware interface. Typically, these external devices use a USB port and translate USB traffic into MIDI signals. An example of such a device is the M-Audio MidiSport 2x2.

All MIDI hardware interfaces require the installation of a Windows-compatible software device driver. Software device drivers are either provided on a CD or can be downloaded from the manufacturer's web site. All you need in addition to the MIDI hardware interface and its software device driver is a pair of MIDI cables, one for MIDI In and the other for MIDI Out.

Configuring MIDIWizard for Your Computer

When you install **MIDIWizard** on your computer, the first thing it needs to know is which MIDI device drivers to use. The **MIDI Driver Setup** feature, accessed via the MIDI menu, displays the options available.

You must select one of the MIDI In and MIDI Out device drivers appearing in the combo boxes. The remaining values are there just in case we have a communications problem. The default values should work just fine.
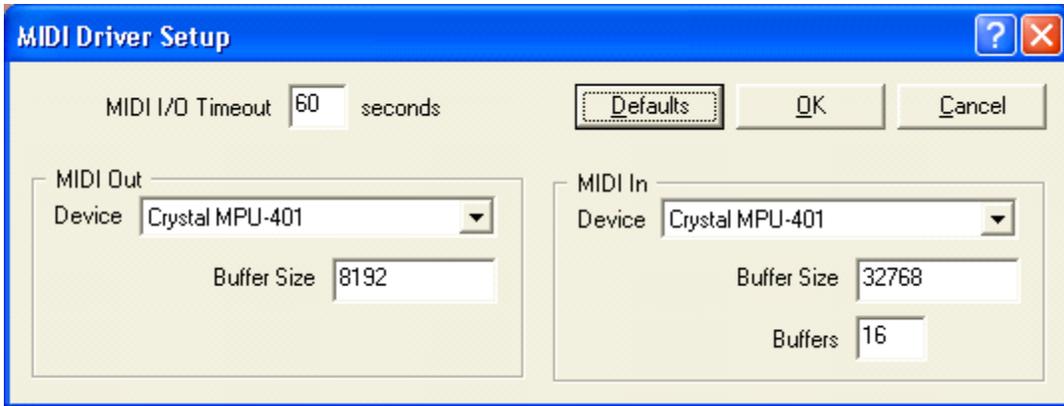
Configuring MIDIWizard for Your GSP-2101

The next thing you need to do is configure **MIDIWizard** so it knows exactly what your GSP-2101 is capable of doing. The **GSP-2101 Driver Setup** feature, accessed via the GSP-2101 menu, displays the options available.

Fortunately, specifying most of the values on this dialog is as simple as clicking the button labeled **Get Values from GSP-2101** and then powering on your GSP-2101.

When you power on the GSP-2101, it automatically sends a couple of MIDI messages that we use to get started. After these, we exchange other MIDI messages that let us know things like which EPROM (chip-set) version is installed, whether or not an optional PPC-210 co-processor board is installed, and how many user and factory programs are available.

The only two values you can change on the GSP-2101 Driver Configuration dialog are the MIDI channel and the delay between SysEx messages. We initialize the MIDI channel using messages we get from the GSP-2101 power on sequence. Normally, you won't have to change this value unless you have two or more GSP-2101s attached to your computer. Now there's a dream!

Most of the communications between **MIDIWizard** and your GSP-2101 use a special type of MIDI message called a System Exclusive message or SysEx for short. SysEx messages can be quite long and your GSP-2101 needs time to "breathe" between sending and receiving a series of SysEx messages.

On the GSP-2101 Driver Configuration screen, you can set the breathing time, or the delay between SysEx messages, in milliseconds. The default of 1 second (1000 milliseconds) is usually sufficient but if we have problems communicating with your GSP-2101, we'll ask you to increase this value.

Backing Up Your GSP-2101 Memory

You've spent many hours creating user algorithms and tweaking programs to get your sound just right. There's a tiny battery in your GSP-2101 that keeps these algorithms and other values safe and warm when you power off your unit. So what happens when this battery goes dead and you need to replace it? Well, if you've never backed up your GSP-2101 memory, you're out of luck.

The Internet discussion forums are full of incidents where a GSP-2101 owner has "locked up" their processor while attempting to create a new algorithm that didn't quite fit into memory. The only way to recover from this memory lockup is to do a "Factory Reset". That means you restore your GSP-2101 to exactly the way it was when you bought it.

Guess what? That means you just lost all your hard work. Horror stories abound. The lesson here is **"Back up your GSP-2101 memory each time you make a significant change to one of your algorithms or programs".**

MIDIWizard walks you through the steps for making a **System Backup**. System backups involve the transmission of multiple SysEx messages containing at least 20,000 bytes of data. The more user algorithms and programs you have, the more bytes are needed. MIDI traffic is susceptible to "noise on the line" during transmission and it is not uncommon to see transmission errors in such large amounts of MIDI data.

MIDIWizard verifies error-free transmission by soliciting at least 2 system dumps from your GSP-2101. Each of the SysEx messages received during the second system dump is compared to the corresponding message received during the first system dump and, if necessary, additional system dumps are solicited until a set of error-free messages is obtained.

A "raw" file format is used when saving a system backup. "Raw" means that a system backup file contains nothing more (or less) than the contents of the six verified SysEx messages received during a system dump.

MIDIWizard's system dump files can be used to restore your GSP-2101 memory. They can also be used by any other MIDI utility program that uses raw SysEx files to restore your GSP-2101 memory.
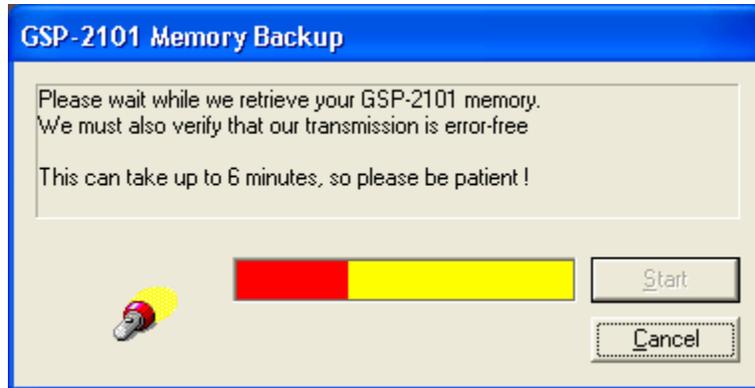

Help! I've Lost My Stuff

OK, so the day finally arrives when the battery in your twenty year old GSP-2101 goes dead. Yep, the date of manufacture on our GSP-2101 is "FEB 1994", so we're looking at a twenty-two year anniversary. You fire up your trusty machine and voila, all your custom programs and algorithms are gone. Your GSP-2101 is essentially the same as it was when you first bought it. If you've never done a system backup, the only thing we can do is send you a box of tissues.

Of course, you've had the foresight to do a system backup at some time or other and we can use the system dump file to restore your memory after you put a new battery in your GSP-2101 – an **Eveready CR 2032** or equivalent. The **System Restore** facility walks you through the process of restoring your GSP-2101's memory.

The first step is selecting one of your system dump files.
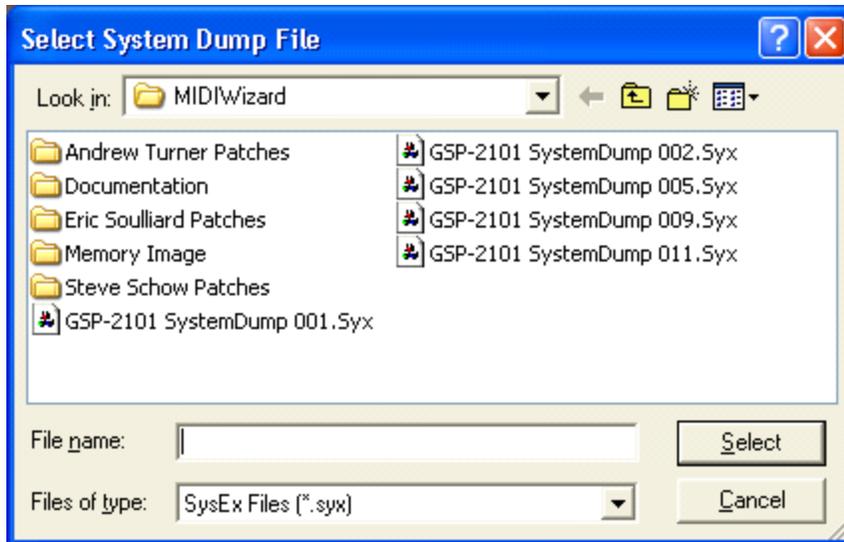
After you select a file, the following screen appears:
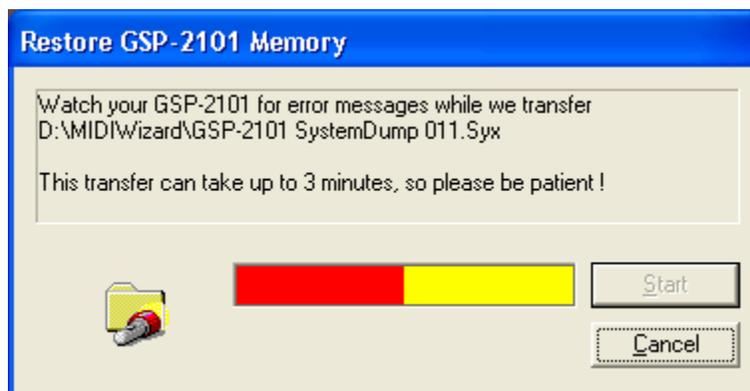
While performing a **System Backup**, we can verify error-free transmission. That's not the case while performing a **System Restore**. Occasionally, while transmitting a system dump file to your GSP-2101, the data is corrupted and the GSP-2101 displays a couple of error messages:

After these messages are displayed, the GSP-2101 performs a factory reset and, at this point, it is oblivious to your custom algorithms and programs. To get your algorithms and programs back, you must repeat the **System Restore** operation.

Although **MIDIWizard** is not able to detect this failure in communications automatically, it is geared up for this eventuality. At the end of the transmission, **MIDIWizard** asks you if all went well:

If you click the **Repeat Send** button, we check to make sure whether or not you need to reset the GSP-2101's MIDI channel before attempting to do a **System Restore** again. A factory reset changes the MIDI channel to 1. If **MIDIWizard** is normally configured to use channel 1 for communicating with your GSP-2101, you're good to go. If it was configured for a channel other than 1, you'll see the following screen:

This goes to eleven

It sometimes takes two or three times around the block before your 2101's memory is successfully restored. After three unsuccessful attempts, we recommend you power off and then power on your GSP-2101 before further attempts.

Another way you can improve the chances of success of this operation is to perform a **Reset Utility/MIDI** on your GSP-2101. Here are the steps:

1. Press the [Utility] button to display the first utility menu
2. Press the [Next] button to display the second utility menu
3. Press function (access) key [2] to display the Factory Reset menu

4.   Press function (access) key [2] again to perform a Reset Utility/MIDI

The above sequence resets the GSP-2101 MIDI channel to 1. If your GSP-2101 is normally configured to use a MIDI channel other than 1, you must now reset the channel to its normal value. Here are the steps:

1.   Press the [MIDI] button to display the first MIDI menu
2.   Press function (access) key [1] to change the MIDI channel
3.   Use the DATA wheel to select the desired MIDI channel
4.   Press the [MIDI] button again to return to the Program Screen
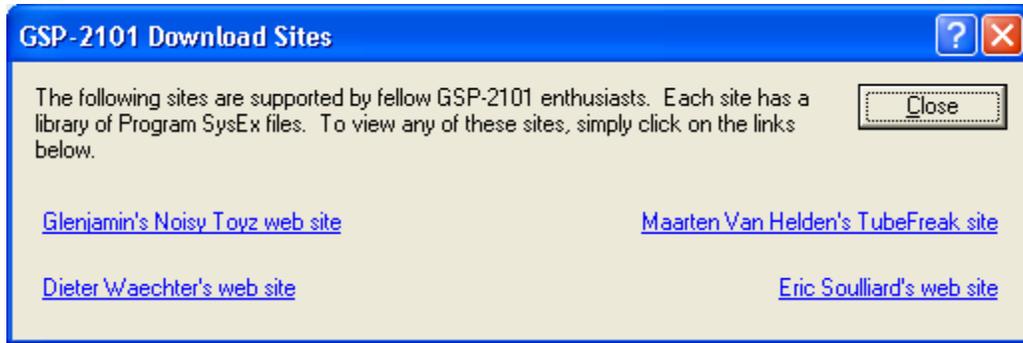

Backing Up and Restoring Programs

The **Program Backup**, **Program Restore**, and **From Internet** features help you back up and restore programs on an individual basis. Contrast this to the **System Backup** and **System Restore** features which save and restore all of your programs in one operation.

The **Program Backup** feature lets you back up any of the user or factory programs on your GSP-2101 and saves them to individual files. The **Program Restore** feature lets you select any of the program backup files for restoring any of your user programs. For example, you can use a backup file saved from program 123 to restore program 45.

While restoring a program, **MIDIWizard** performs extensive error-checking on the program file you select. These checks are particularly important if you are loading a program file downloaded from the Internet. MIDIWizard can accommodate the following inconsistencies:
   · The program backup file was created using an EPROM version prior to 3.00.00.
   · The file was created using a different MIDI channel for communications.
   · The algorithm associated with the program backup file uses the optional PPC-210 card and your GSP-2101 does not have this option installed.

The **From Internet** feature helps locate various Internet web sites sponsored by various fellow GSP-2101 enthusiasts. You simply click on one of the links to connect to the corresponding site and then download any of the SYX "patch" files available. These patch files are nothing other than backup files of user programs that these guys have created on their own machines.

GSP-2101 Download Sites

The following sites are supported by fellow GSP-2101 enthusiasts. Each site has a library of Program SysEx files. To view any of these sites, simply click on the links below.

Glenjamin's Noisy Toyz web site   Maarten Van Helden's TubeFreak site

Dieter Waechter's web site   Eric Soulliard's web site

Be sure to sign the visitors' book at these web sites and thank these guys for being so benevolent. They've spent a considerable amount of time building custom programs and uploading them to the Internet for your use.

Creating a Set of Program Backup Files from a System Backup

Each time you perform a **System Backup**, a backup file is created. The first backup file you create has the default name "GSP-2101 SystemDump 001.Syx". These system dump files comprise 6 System Exclusive (SysEx) messages containing, among other things, all user programs and algorithms.

The **Create Program Syx** feature uses one of your system backup files to create a complete set of program backup files, one for each of your user programs. This saves you from having to use the **Program Backup** feature repeatedly to back up each of your user programs. Each of the files generated by the **Create Program Syx** feature is the same as if you'd used the **Program Backup** feature.

Whenever one of your programs is associated with a user algorithm, a copy of the algorithm is saved in the same file. The **Program Restore** feature can be used with any of these files to restore programs on an individual basis.


Changing Program Parameters
NOTE: This feature is available only to those GSP-2101s that have version 3.00.00 EPROMs installed.

The **Modify Program** feature loads the current GSP-2101 program into your computer and then allows you to change parameters using sliders, check boxes and combo boxes rather than the GSP-2101's buttons and DATA wheel.
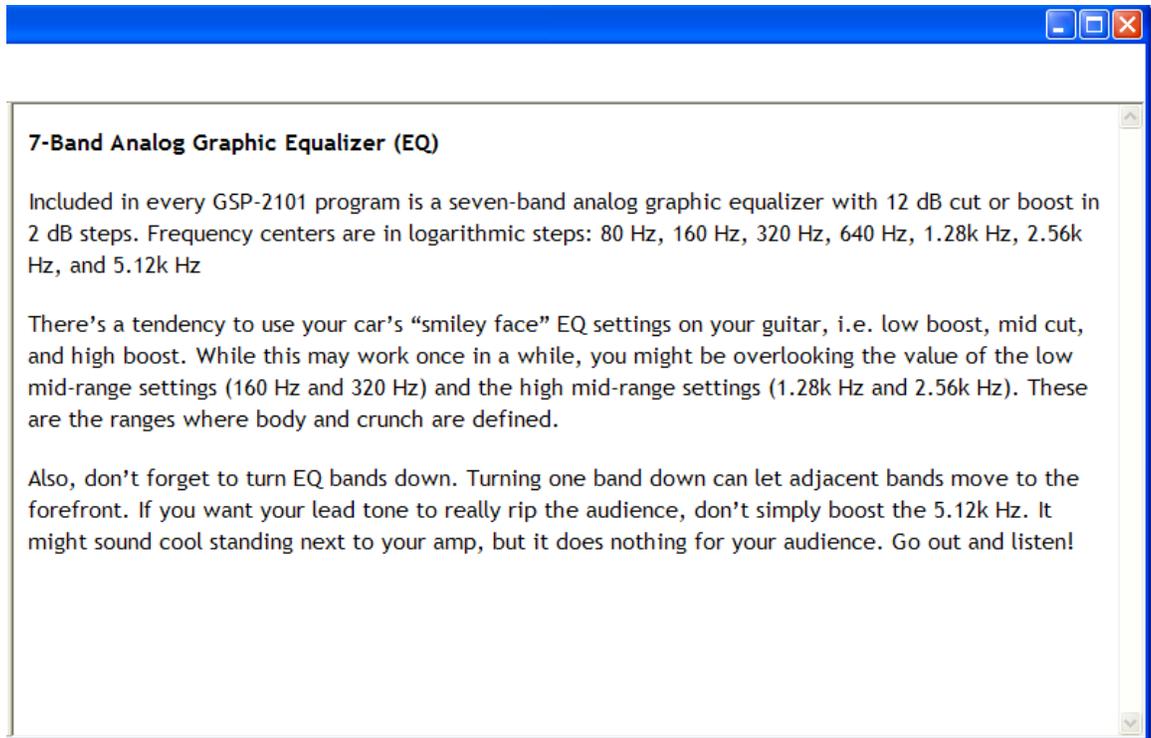
The down-side to this approach is that it takes about 4 seconds to make a parameter change. This is due to the I/O overhead associated with transmitting MIDI System Exclusive messages. The up-side is that, by using the vertical scroll bar down the right-

hand side of the view to move up and down, you can quickly get a feel for all your program settings.
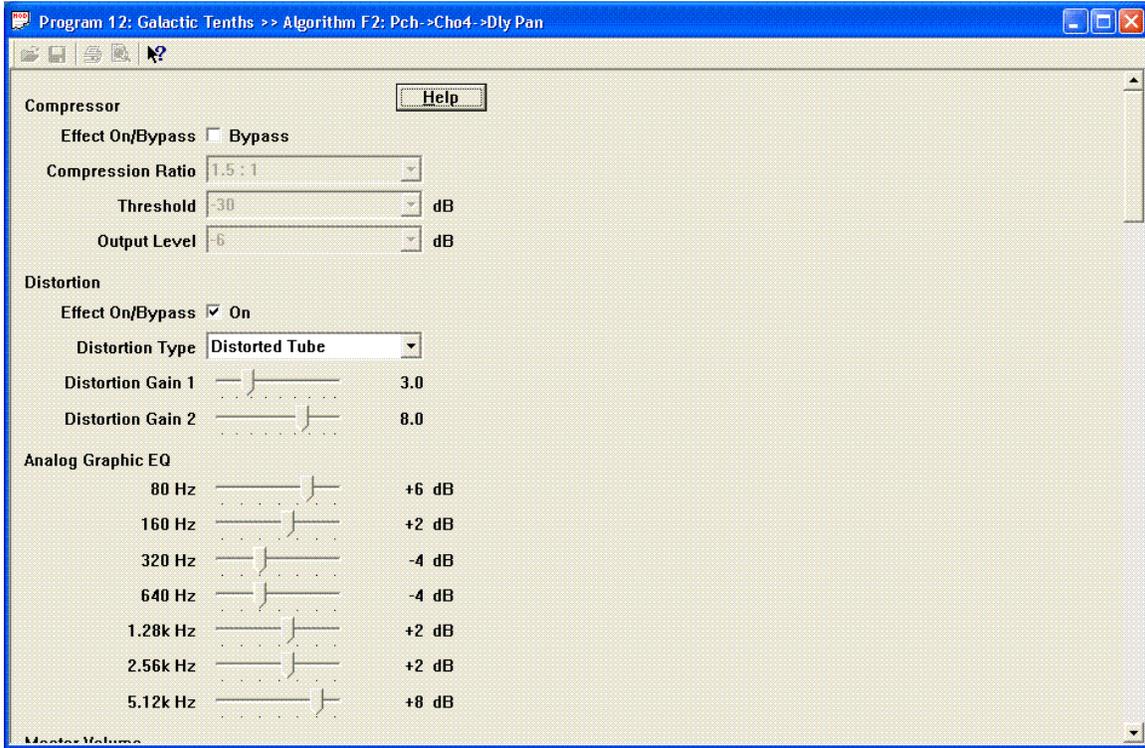
We've spent a lot of time writing on-line help for this feature. The ![Help] button at the top of the form gives details about how to use the various controls and how to start and stop sending parameter changes to your GSP-2101.

Also, there's context-sensitive help available for each control. To display context-sensitive help, first highlight the control using either the mouse or keyboard, and then press the F1 key. Alternatively, you can click on the context help button ![context help] on the tool bar and then use the special mouse cursor to click on any control. As an example, here's the context-sensitive help for one of the analog graphic EQ slider controls:

7-Band Analog Graphic Equalizer (EQ)

Included in every GSP-2101 program is a seven-band analog graphic equalizer with 12 dB cut or boost in 2 dB steps. Frequency centers are in logarithmic steps: 80 Hz, 160 Hz, 320 Hz, 640 Hz, 1.28k Hz, 2.56k Hz, and 5.12k Hz

There's a tendency to use your car's "smiley face" EQ settings on your guitar, i.e. low boost, mid cut, and high boost. While this may work once in a while, you might be overlooking the value of the low mid-range settings (160 Hz and 320 Hz) and the high mid-range settings (1.28k Hz and 2.56k Hz). These are the ranges where body and crunch are defined.

Also, don't forget to turn EQ bands down. Turning one band down can let adjacent bands move to the forefront. If you want your lead tone to really rip the audience, don't simply boost the 5.12k Hz. It might sound cool standing next to your amp, but it does nothing for your audience. Go out and listen!

Each time you change one of the settings, be it a slider control, a check box, or drop-down box, the corresponding parameter change is transmitted to your GSP-2101. You can tell when a change is being transmitted because the green "MIDI busy" indicator in the bottom-right corner of the window turns red.

While the "MIDI busy" indicator is red, both close window buttons are deactivated and you cannot close the **Modify Program** feature or exit **MIDIWizard**.

After your change has been sent to your GSP-2101, the "MIDI busy" indicator changes back to green and the close window buttons are reactivated.

When you've finished making changes to the current program, don't forget to press the [Store] button on your GSP-2101 if you want to save them. At this point, the GSP-2101 doesn't warn you about saving changes when you try to scroll to another program, so it's all too easy to trash your new settings.

If you prefer to navigate with your keyboard rather than your mouse, the cursor movement keys are mapped as follows:

- **F1 key** displays help for the highlighted control
- **Enter key** moves to the next control
- **Tab key** moves to the next control
- **Shift** + **Tab** moves to the previous control
- **CursorUp** moves to the previous control
- **CursorDown** moves to the next control
- **PageUp** moves up about 8 controls
- **PageDown** moves down about 8 controls
- **Shift** + **Home** moves to the first control (Compressor On/Bypass)
- **Shift** + **End** moves to the last control (Wet to Dry Mix)

MIDIWizard's Help feature tells you how to use the keyboard to change settings for the slider, combo box, check box, and edit controls.

Sending Random Changes to Your GSP-2101
NOTE: This feature is available only to those GSP-2101s that have version 3.00.00 EPROMs installed.

The **Random Changes** feature loads the current GSP-2101 program into your computer and then sends random parameter changes back to your GSP-2101.

How much time do you spend trying to get the "right" sound? You pull up a program on your GSP-2101, play your guitar through it for a while, and then start twiddling with the controls trying to get the sound just "right". By the time you've changed a parameter or two on the GSP-2101, you get back to playing your guitar but you've forgotten how good (or how bad) the previous sound was.

After a few go a-rounds, you start wishing you had two pairs of hands and two brains; one for playing your guitar and one for twiddling with the GSP-2101 controls and reading the Owner's Manual. The **Random Changes** feature tries to solve this dilemma. It sends random program changes to your GSP-2101 automatically, leaving you to concentrate on playing your guitar and listening to the different sounds produced by your GSP-2101. When you hear a sound you like, you can stop sending random changes and save the current settings.
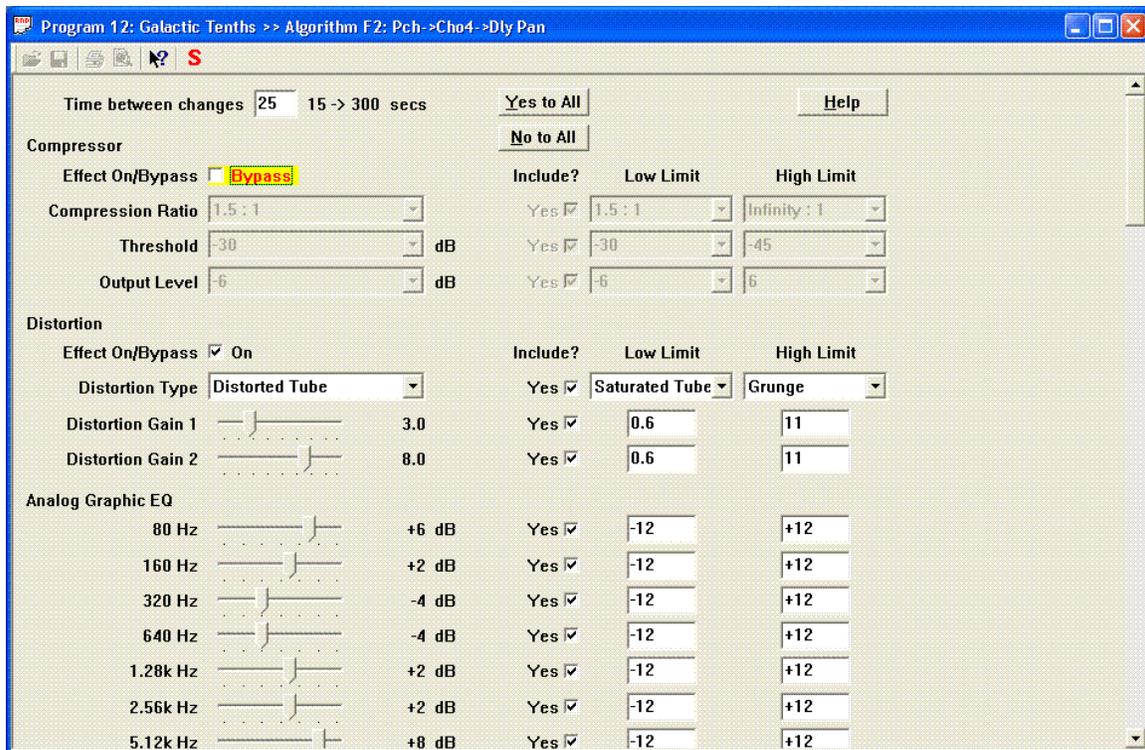
You decide which parameters are changed

There's a column of Yes/No check boxes that lets you decide which parameters should be "**Included**" in the random process. Initially, all these boxes are checked.

You can quickly "uncheck" all these boxes by clicking the **No to All** button.

The **Yes to All** button "checks" them all again.

You decide the low and high limits

You can restrict random changes to a range of values by selecting low and high limits for each parameter. Initially, the low limit is set to the parameter's minimum value and the high limit is set to its maximum value. If you are numerically disadvantaged and set the low limit greater than the high limit, we'll warn you before we crank up the random superconductor thingamajig.

You decide how much time to spend between changes

At the top of the form, there's an edit box for setting the time between random changes. You can specify any value between 15 seconds and 300 seconds (5 minutes).

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The tool bar button is a start / stop button. It either starts sending random changes to your GSP-2101 or stops sending them. When it starts sending random changes, the "MIDI busy" indicator in the bottom-right corner of the status bar turns red.

While the "MIDI busy" indicator is red, both close window buttons are deactivated and you cannot close the **Random Changes** feature or exit **MIDIWizard**.

If necessary, **MIDIWizard** scrolls the view each time a random change is sent to your GSP-2101 so you can see the new parameter value. If, for example, you choose 60 seconds between random changes, you should see the view scroll every minute. The control corresponding to the new change is highlighted. For some controls, the highlight is a color change and for others, it's just a shadow box around the control.

When you press the button again to stop sending random changes, the "MIDI busy" indicator reverts to green and the close window buttons are reactivated. Be aware that it may take 3 to 4 seconds for the indicator to turn green if we're in the middle of sending a random parameter change.

When you've finished making changes to the current program, don't forget to press the [Store] button on your GSP-2101 if you want to save them. At this point, the GSP-2101 doesn't warn you about saving changes when you try to scroll to another program, so it's all too easy to trash your new settings.

Here's a summary of how the button works:

- · The [S] button acts as a "start" "stop" button.
- · The status bar indicator is red while sending random changes to your GSP-2101.
- · The status bar indicator is green otherwise.
- · Use the [S] button to stop sending random changes. When you do, it can take 3 to 4 seconds for the indicator to turn green.
- · After you stop, you can start sending random changes again by clicking the [S] button.

If you prefer to navigate with your keyboard rather than your mouse, the cursor movement keys are mapped as follows:

- · **F1 key** displays help for the highlighted control
- · **Enter key** moves to the next control
- · **Tab key** moves to the next control
- · **Shift** + **Tab** moves to the previous control
- · **CursorUp** moves to the control above the current control in the same column
- · **CursorDown** moves to the control below the current control in the same column
- · **PageUp** moves up 8 controls, like pressing the **CursorUp** key 8 times
- · **PageDown** moves down 8 controls, like pressing the **CursorDown** key 8 times
- · **Shift** + **Home** moves to the first control in the same column
- · **Shift** + **End** moves to the last control in the same column

MIDIWizard's Help feature tells you how to use the keyboard to change settings for the slider, combo box, check box, and edit controls.

Hackers Unite

We've included some features in **MIDIWizard** intended for MIDI hackers and those of you interested in learning about MIDI message formats and how GSP-2101 memory is laid out. These features are called **Memory Config**, **Display Memory**, and **Send SysEx Message**. You don't have to understand or use these features to know how to do system backups or modify programs, but they can be interesting learning tools.


Memory Config

The **Memory Config** option retrieves information from your GSP-2101 about how memory is being used. The factory values are standard for those of us with version 3.00.00 EPROMs. User values depend on the number of custom algorithms and programs you have created.
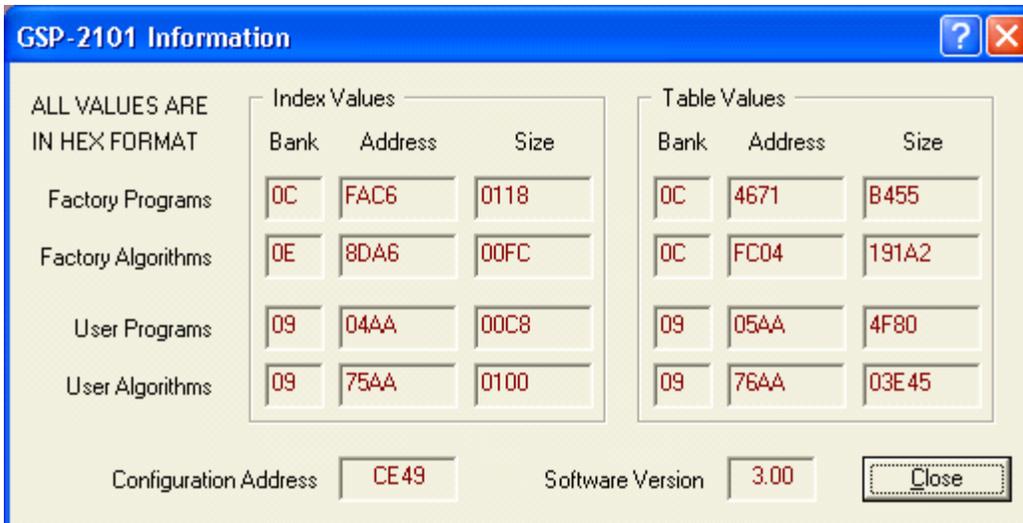
Display Memory

Memory on board the GSP-2101 is organized into banks of 64k bytes. Banks are numbered 0H through FH (0 through 15 decimal). The above screen shot shows each address as a bank number and an offset from the start of the bank.

Suppose you want to see what memory looks like at the "Configuration Address". In the above screen, the Configuration Address value is displayed as CE49. This is a hexadecimal value and corresponds to an offset in memory bank 0. Use the **Display Memory** option and the values in the following screen to retrieve up to 127 bytes at this memory address. **MIDIWizard** saves the retrieved values in a file and displays them in a "human readable" form using the Window's **Notepad** utility.
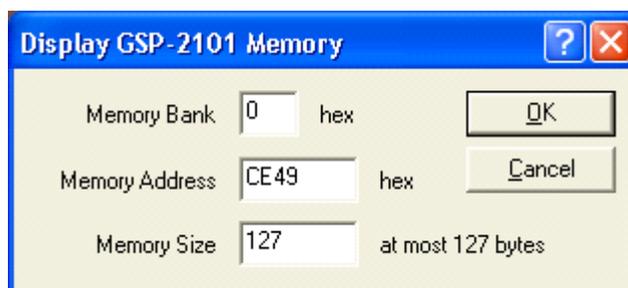
Send SysEx Message

The **Send SysEx Message** feature allows you to specify the body of a short SysEx message and send it to your GSP-2101. Six "header" bytes are pre-configured so you don't have to type them in. These header bytes contain information such as DigiTech's MIDI manufacturer ID, the channel being used to communicate with your GSP-2101, and the GSP-2101's device ID, which is 41H.

For example, if you wish to retrieve the "Module Table" from your GSP-2101, type the value 50 in any of the **Hex** edit boxes. Note that 50H has the corresponding decimal value of 80. Leave all other **Hex** edit boxes empty. Empty boxes are ignored.

Your GSP-2101 responds to this message by sending a single SysEx message back to your computer containing the "Module Table" (SysEx message 51H), so you need to specify 1 in the **SysEx messages** edit box.

When you click the Send button, your SysEx message is transmitted to your GSP-2101 and, after a short while, the response is detected at MIDI In. A dialog allows you to save the contents of this message to a file of your choosing.


The FileHacker Utility

If you've gone through the steps in the previous **Send SysEx Message** section, you end up saving a file with the contents of your GSP-2101's "Module Table". This file is in binary (or machine-readable) format so it won't make much sense if you try to open it with a text editor such as Notepad or Microsoft Word.

To inspect the contents of the "Module Table", or any other binary file for that matter, we've provided a utility called **FileHacker**. **FileHacker** is a program we developed some time ago to help us snoop around other people's files. It can be used to repair the contents of files that have been corrupted due to transmission errors, old age, etc.

You access **FileHacker** using the **File / Open** option. First, you select the file you want to view and then **FileHacker** displays the contents of this file.
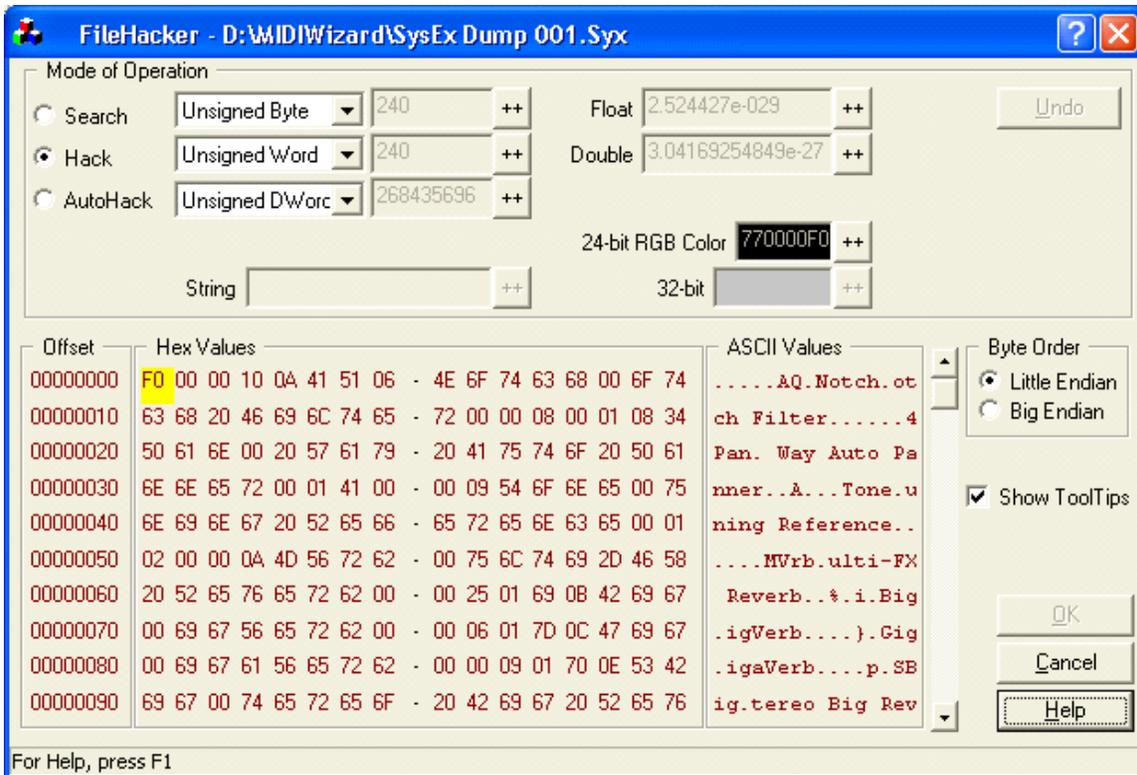
File contents are displayed in two formats. The **Hex Values** box shows the contents in hexadecimal format. The **ASCII Values** box shows the contents in ASCII (human-readable) format, wherever possible – not all hexadecimal values have an ASCII equivalent. We use dots where there is no ASCII conversion. Use the vertical scroll bar to move up and down the file.

We've spent a lot of time writing Help for **FileHacker**. Don't be afraid to click the **Help** button. Context-help is available for most **FileHacker** controls by clicking the title bar help button and then clicking the control you want help for.