

DigitTech

GUITAR SIGNAL PROCESSOR

GSP-21

OWNER'S MANUAL

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GSP-21 GUITAR SIGNAL PROCESSOR MANUAL

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INTRODUCTION

DigiTech's versatile GSP-21 is the last word in guitar signal processors. It's the only one with a choice of 21 different effects, and up to 10 of those effects can be played at the same time using the full-function foot controller provided with the GSP-21. The foot controller makes it possible to switch effects, patches and parameters without stopping the music.

The GSP-21 provides eight digitally-controlled analog effects:

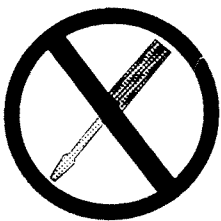
- * Compression
- * Metal tube, Over-drive, Rock tube and Heavy Sustain distortions
- * 7-band graphic EQ
- * Noise gating
- * Enhancing
- * Speaker simulation

There are also 17 digital effects:

- * Stereo, ping-pong, and multi-tap delays
- * Slap-back
- * Effects submixing
- * Digital mixing
- * Chorusing and flanging
- * Large room and small room reverbs
- * Gated, reverse, and ultimate reverbs
- * Comb filtering
- * Limiting
- * Parametric EQ
- * Stereo imaging

DigiTech's own HISC 20-bit VLSI engine produces non-stop dynamic sound effects with maximum frequency response. It all adds up to the world's most advanced guitar signal processor—the GSP-21.

SAFETY PRECAUTIONS



Use only standard AC voltage. Unprotected dangerous voltages are present within the product enclosure. Opening the chassis for any reason will void the manufacturer warranty.



Do not get the GSP-21 wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service.

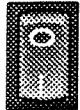
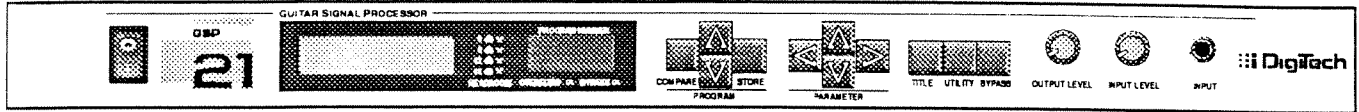
Use of a surge protector is recommended to decrease chances of equipment damage from voltage surges or spikes. The GSP-21 may also be damaged during electrical storms if connected to an AC outlet. Disconnect the equipment during storms to prevent damage.

QUICK-START

For best performance from the GSP-21, follow the instructions below. See "Making Connections" (page 7) and related sections for detailed instructions.

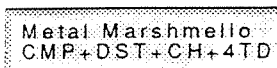
- INSTALL Mount the GSP-21 in a rack with the provided screws. Rubber feet have also been affixed to the unit for free-standing use.
- APPLY POWER Route the power cord away from audio lines to prevent interference.
- CONNECT CABLES Connect audio input and output cables to the rear jacks. Either balanced (tip-ring-sleeve) or unbalanced (tip-sleeve) cables may be used. The rear-panel headphone jack permits using the GSP-21 without an amplifier. See "Making Connections" (page 7).
- CONNECT FOOT CONTROLLER Plug in the provided foot controller to the rear jack. See "Foot Controller" (page 21).
- ADJUST INPUT Turn on the GSP-21. Set the instrument, amp, and/or mixer to loudest operation that will be used. Adjust the GSP-21 input level until the red headroom LED comes on occasionally.
- ADJUST OUTPUT Set the GSP-21 output level to the desired volume.
- CREATE EFFECTS LOOPS Connect any external effects devices to the GSP-21 effects send and return jacks. NOTE: external devices must be unity gain, such as the DigiTech IPS 33B Intelligent Harmony Machine. See "External Effects Loops" (Page 8)
- CONNECT MIDI CONTROLLER Plug in a MIDI controller, sequencer or synthesizer to the rear MIDI IN jack, if desired. See "Utility Menu" (page 13).
- SELECT PROGRAM Begin jamming by choosing any preset program or user-defined program using the up and down program buttons.

FRONT PANEL

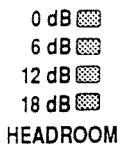


POWER Turns the GSP-21 on and off. When turned on, the unit returns to the same program as when it was shut off.

DISPLAY MODE OPTION Press the COMPARE button when turning on, and the GSP-21 goes into display mode. It will stay in this mode until any button is pressed.



LCD 16-character, two-line liquid crystal display shows the current program title, configuration, or effect and utility parameters.



HEADROOM Four LEDs display the input signal level. The best signal level is when the green LEDs light and the red LED peaks occasionally. See "Making Connections" (page 7).



OVERFLOW Single LED indicates too much internal gain, overloading the HISC processor. Turn down the programmable mix and effects levels.



BYPASS LED Single LED shows effects are muted and a dry input signal is being sent directly to the output.



PROGRAM NUMBER Three-digit LED displays the selected program number.



COMPARE Compares current program being edited to the original program.

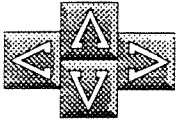


PROGRAM Changes and selects program numbers. Wraps around from 1 to 128.



STORE

STORE Saves new effect configurations to a selected program number. See "Store" (page 11).



PARAMETER

PARAMETER Left and right buttons select the next effects parameter, pull up the next utility function, or move to next title letter.

Up and down buttons change selected effect parameter values, utility parameters, or title letter. See "Programming" (page 9) and "Utility Menu" (page 13).



TITLE

TITLE Allows the name of the current program to be edited. See "Title" (page 12).



UTILITY

UTILITY Displays the utility menu on the LCD. Includes MIDI channel select, continuous controller links, MIDI mapping, program transmitting, footswitch or remote controller select, footswitch programming, and restoring factory presets. See "Utility Menu" (page 9).



BYPASS

BYPASS BUTTON Shuts off effects and sends a dry signal direct to the output.



OUTPUT LEVEL

OUTPUT LEVEL Adjusts the output signal to the desired level. See "Making Connections" (page 7).

Individual effect output levels can also be programmed internally. See "Effect Parameters" (page 24).



INPUT LEVEL

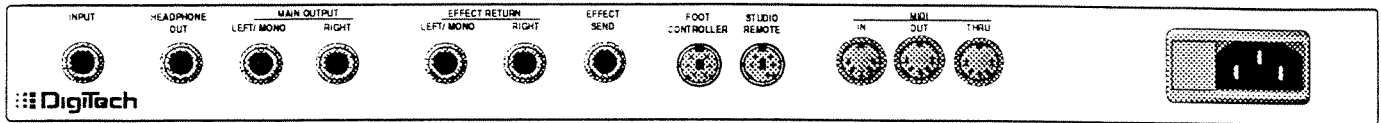
INPUT LEVEL Adjusts the strength of the received stereo or mono signal to an optimum level. See "Making Connections" (page 7).



INPUT

INPUT JACK Standard 1/4-inch T-R-S jack for guitar or line-level signals. Rear INPUT is bypassed when front INPUT is used. See "Making Connections" (page 7).

REAR PANEL



INPUT JACK Single 1/4-inch Tip-Ring-Sleeve (T-R-S) jack for balanced or unbalanced instrument or line signals. Mono input signal only.

HEADPHONE JACK 1/4-inch T-R-S jack for stereo headphones ONLY. Permits using the GSP-21 without an amplifier. **WARNING: Plugging a mono plug into the headphone jack will damage the GSP-21.**

EFFECTS SEND 1/4-inch T-R-S jack to send signals from the GSP-21 to external effects devices.

EFFECTS RETURN 1/4-inch T-R-S jack to return signals from external effects devices to the GSP-21.

OUTPUT JACKS Two 1/4-inch T-R-S jacks for stereo output to amplifier, mixing console, or effects loop. Use the left (mono) jack for mono only, or a mix of both left and right for best mono sound.



REMOTE JACK Five-pin DIN jack to connect DigiTech's optional studio remote controller.



FOOTSWITCH JACK Six-pin DIN jack to connect the provided DigiTech foot controller. Pedal functions can be programmed. See "Utility Menu" (page 13).



MIDI IN JACK Five-pin DIN for standard MIDI cable. Receives MIDI control data. See "Utility Menu" (page 13).

MIDI IN



MIDI OUT JACK Five-pin DIN for standard MIDI cable. Sends MIDI control data. See "Utility Menu" (page 13).

MIDI OUT



MIDI THRU JACK Five-pin DIN for standard MIDI cable. Passes MIDI control data between devices. See "Utility Menu" (page 13).

MIDI THRU



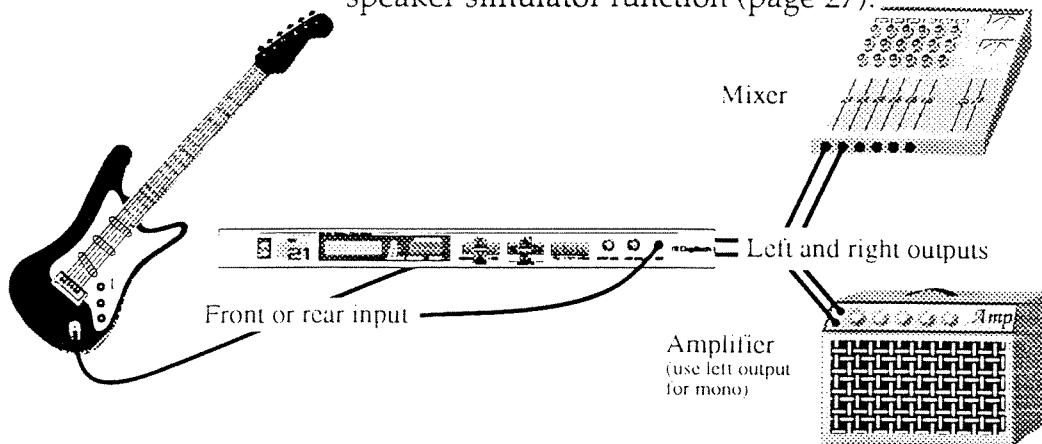
FUSE Accessible from the rear panel. Use only 250 Volt 200 mAmp slow blow fuse.

MAKING CONNECTIONS

The GSP-21 creates the ultimate in stereo or mono sound effects from instruments or line signals.

DIRECT CONNECTIONS For direct connections, configure the instrument, GSP-21 and amplifier as follows:

Mono In, Stereo Out Connect the instrument to the GSP-21 front or rear input jack. Connect the left and right outputs to the amplifier or mixer inputs. To match the sound of any speaker or amplifier, use the speaker simulator function (page 27).

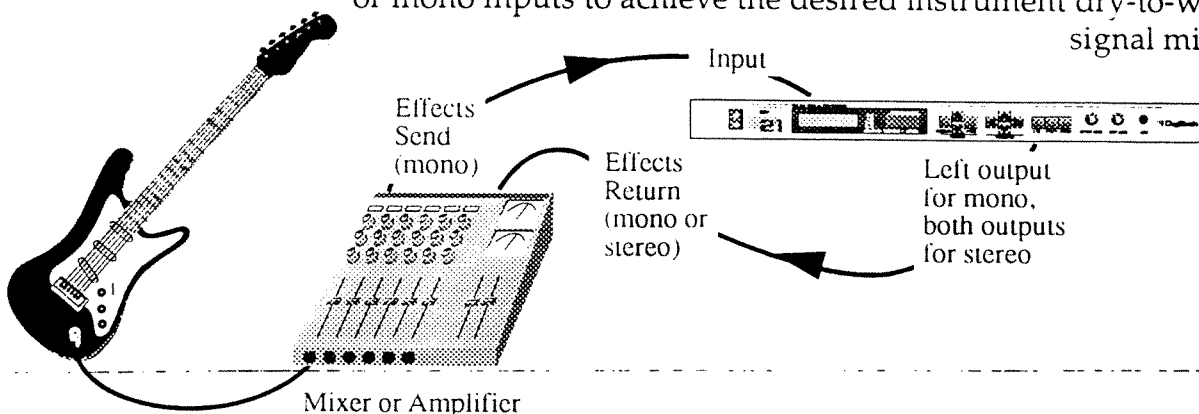


EXTERNAL EFFECTS LOOPS The GSP-21 can be used in a loop-through with amplifiers, mixers, or consoles. Use the following configurations:

Using Mono Send & Return Connect the instrument to the mixer or amp input. Connect the mixer effects send to the GSP-21 input, then from the GSP-21 left output to the mixer effects return.

Using Auxiliary Output & Inputs (Mono to Stereo) Connect a mono mixer auxiliary output to the GSP-21 input. Connect both GSP-21 outputs to the mixer's input channels or auxiliary returns.

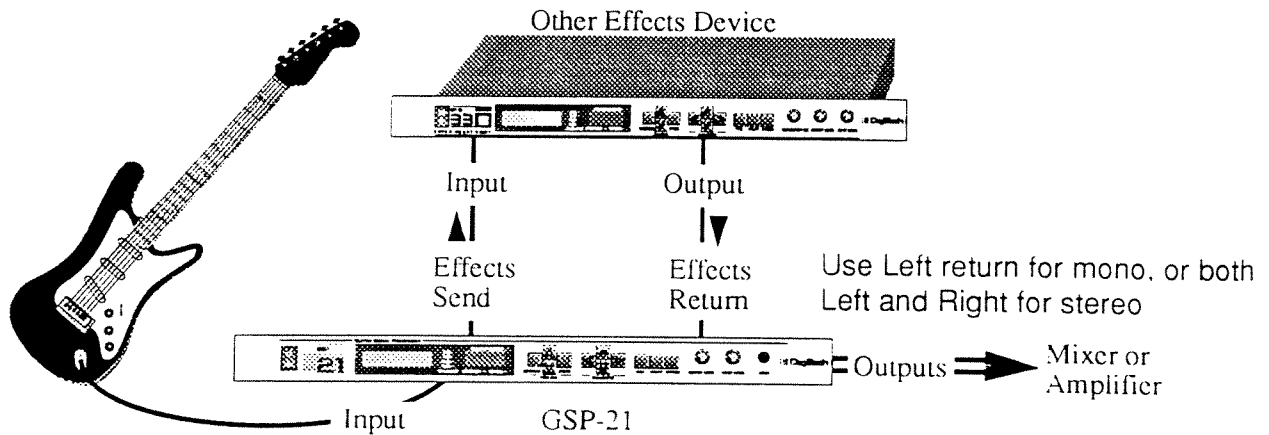
Numerous configurations can be made with multiple mixers and amps. Experiment with stereo or mono outputs going to stereo or mono inputs to achieve the desired instrument dry-to-wet signal mix.



GSP-21 EFFECTS LOOPS With its own effects send and return, the GSP-21 can be used to create effects loops with or without external mixers.

Connect the instrument to the GSP-21 input. Connect the GSP-21 mono effects send to the external device, then back to the GSP-21 mono effects return.

The effects send and return operate at line level only, so the external device must be set for a line level output.



ADJUST INPUT AND OUTPUT



Input After connecting the GSP-21 inputs and outputs, set the instrument, amp, and/or mixer to loudest operation that will be used. Adjust the GSP-21 input level so the red headroom LED only occasionally comes on. The red LED comes on just before the signal is clipped.



Output Turn up the output level to the optimum level for the amplifier or mixer, being careful to avoid overload.

PROGRAMMING

SELECTING PROGRAMS

While reading this section, you may refer to the Programming Map.

Metal Marshmello
Cmp Dst Ch 4TD

Press the up or down program buttons on the front panel to change programs. Program numbers will appear on the red program LED, and program names and configurations will appear on the LCD.

The program numbers will wrap around from program 1 to program 128 when using the Program Down button, and from 128 to 1 when using the Program Up button.

The first 64 slots (programs 1 through 64) can be user-programmed to create custom sounds or variations on the factory preset programs. When shipped from the factory, these slots contain copies of the preset programs.

DigiTech has provided 64 preset effects (programs 65 through 128) which represent a wide range of versatile configurations designed and named by a panel of studio musicians and technicians.

CREATING PROGRAMS

To customize a program, start by selecting one of the first 64 slots. Modify the preset as desired, change the name, then store it.

Select a Preset Program

Each program is unique with different effects and parameters. Choose any program and begin experimenting to create distinctive sounds.

Changing Configurations

Push the right button on the front panel and the display reads:



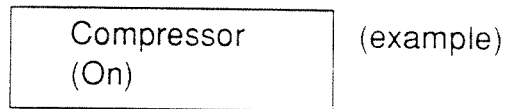
Cmp+ Dst+ EQ+ NG+ E+
L+ Ch+ 4TD+ Mx+ SS

(example)

The GSP-21 is now in the editing mode, where new effects configurations can be selected and effect parameters changed. See Appendix A: "Effect Configurations" (page 31).

A configuration consists of a pre-defined combination of effects. Use the up and down parameter buttons to choose a configuration.

Changing Parameters Press the LEFT or RIGHT PARAMETER buttons to select an effect parameter to be changed. The display will read:



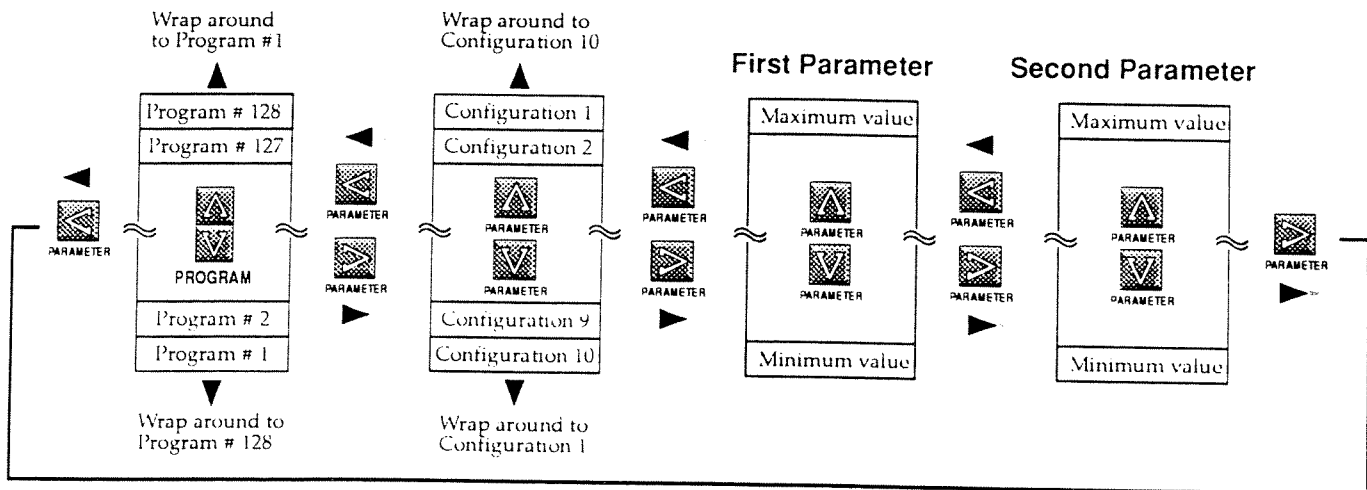
Parenthesis appear around the original effect parameters so they can be reset if a modified effect doesn't sound right. Each effect can also be bypassed. If bypass is on, the effect's options will not be displayed.

Push the PARAMETER UP and DOWN buttons and the value of the selected parameter changes. Set the effect parameter to the desired value, then push the PARAMETER LEFT or RIGHT buttons for the next effect parameter.

While adjusting the effect parameter value, play the instrument to hear what happens as the value is changed. The COMPARE button can also be used to see how the new parameters sound as compared to the original unedited program. See "Compare" (page 12).

Change the Name After creating a new effect configuration, give it a name. Press the TITLE button and a cursor appears under the first character in the program title. Move the cursor through the title using the LEFT and RIGHT PARAMETER buttons. Change characters with the PARAMETER UP and DOWN buttons. Press the TITLE button again when finished. See "Title" (page 12).

Programming Map





STORE After selecting the desired effects, editing the effect parameters and changing the title, press the STORE button to save the changes. The display will read:

Save Changes to
12

The current program number will be shown if a user slot (1-64) is being edited. The new program can be stored to a different number by pressing the PROGRAM UP or DOWN buttons.

If a preset slot (65 - 128) is being edited, the corresponding user slot number will be shown when the STORE button is pressed. This number can also be changed by pressing the PROGRAM UP or DOWN buttons.

Each user slot comes from the factory with a copy of the preset 64 slots above it. For example, user slot 12 is a copy of program 76.

To save to the displayed program number, press the STORE button again. The display will read:

.... Storing

Cancelling Store If the store button was accidentally pressed, escape back to the editing mode by pressing the COMPARE button.

Aborting Changes If the program has been edited but not stored, the GSP-21 will cancel the changes when the PROGRAM button is pushed. To prevent losing edited programs, the display will read:

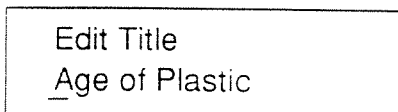
To save changes
press (STORE)

At this point there are three options:

1. Save the changes by pressing the STORE button.
2. Abort the changes by pressing the UP or DOWN PARAMETER buttons.
3. Escape from the warning display by pressing the COMPARE button. The display returns to the editing mode.

When new programs are stored, write them in the "User Programs" (Appendix B). This will help keep track of all the programs and sounds that are stored on the GSP-21.

TITLE Program titles can be changed by pressing the TITLE button. The display will read:



A cursor appears under the first character in the title. Move the cursor through the title using the LEFT and RIGHT PARAMETER buttons.

To change characters in the title name, press the UP or DOWN PARAMETER buttons. Up to 16 characters can be used in each name using the following letters and symbols:

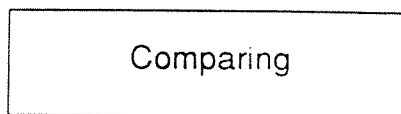
space ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789 ! " # \$ % & ' () * + , - . / :
left arrow, right arrow ; < = > ? @ [] ^ _ ` { | }

After changing the title, press the TITLE button again. The GSP-21 will return to the mode it was in before the title button was pressed. To save the title and the new program, press the STORE button.

COMPARE The COMPARE button is used while editing to contrast the new effect configuration against the original unedited program.



While editing a program, push the COMPARE button. If nothing happens, no changes have been made to the program. If changes have been made, the display will read:



Play the instrument to hear the sound of the original program. Press the COMPARE button again and the display returns to the edited version to hear its sound and make changes.

Using the COMPARE button, toggle back and forth between the original program and the modified version, making changes until the sound is just right.

Press Compare to Escape The COMPARE button is also used as an escape button from the following modes:

1. When the STORE button is accidentally pushed, press COMPARE to escape back to editing mode.
2. When a wrong program number is pushed using the optional studio remote controller, press COMPARE to escape and start over.

BYPASS When the BYPASS button is pressed, all effects are shut off and a dry signal is relayed. This is great during performances, where effects can be turned on or off with the push of a button.



BYPASS

Press the BYPASS button again to toggle effects back on. See Foot Controller operation (page 20) for a description of the Footswitch Bypass action.

UTILITY MENU

Press the UTILITY button to access the Utility Menu:

1. Speaker Simulator selection
2. Speaker Simulator Setup Menu
 - A. Simulator User programmable settings U-1 — U-5
 - B. Return to Utility Menu
3. MIDI Setup Menu
 - A. Select MIDI Receive channel
 - B. Set Program Receive Map
 - C. Select MIDI Transmit Channel
 - D. Set MIDI Program Transmit Map
 - E. Change Global MIDI continuous controller (CC) links
 - F. Change first Local MIDI Continuous Controller link
 - G. Change second Local MIDI CC link
 - H. Dump MIDI Data (Send all programs to a MIDI computer, MIDI recorder or another GSP-21)
 - I. Dump Current Program (Send a single program)
 - J. Return to Utility Menu.
4. Foot Controller Setup Menu
 - A. Foot Controller Mode (Five Patch or Ten Patch)
 - B. Programming SETs and PATCHes
 - C. Return to Utility Menu
5. Factory Preset Restore Menu
 - A. Restore unit to factory preset condition
 - B. Return to Utility Menu
6. Show software version number
7. Change the LCD contrast



UTILITY

After pressing the utility button, move through the utility functions by pressing the right or left parameter buttons. Exit the utility mode by pressing the UTILITY button again.

MIDI MIDI is used by music equipment manufacturers to allow different components to communicate with each other. For example, a synthesizer, MIDI controller or MIDI computer could be used to change the volume or program number of all components on the same MIDI channel, including the GSP-21.

There are 128 MIDI functions, called continuous controllers, which can be used to externally control most functions of the GSP-21. See Appendix D, "Standard MIDI Continuous Controllers"

SPEAKER SIMULATOR An important part of a good guitar sound is the way that both the amplifier and speaker "color" the sound going through them. The Speaker Simulator electronically emulates different types of speaker / amplifier combinations. This allows you to play the GSP-21 directly into the mixer board or tape input, and retain the desirable miked-amplifier sound for recording.

When the UTILITY button is first pressed, the display will read:

Speaker Simltr 1	(example)
---------------------	-----------

Use the PARAMETER UP and DOWN buttons to select among the 9 different Speaker Simulator presets and the 5 User Programmable Speaker Simulator presets. Press PARAMETER RIGHT to go to the next Utility item, or UTILITY to exit.

**SPEAKER SIMULATOR
SETUP MENU**

This utility allows you to program your own Speaker Simulator response curves, and store them in User Presets U-1 through U-5. The cursor will start under the User preset number. Press PARAMETER UP or DOWN to go to the desired preset number. Press PARAMETER RIGHT, and the cursor will be under the first Simulator Band. Pressing PARAMETER UP or DOWN will increase or decrease the band response, shaping the low response of the simulated speaker (this will make it sound like a larger speaker cabinet). Press PARAMETER RIGHT to go to each of the other Simulator Bands, which each adjust higher speaker response bands. Press PARAMETER RIGHT after the last Band, and the display will read:

Return to Main Utility Menu ↑

Press PARAMETER UP to return to the Utility Menu, or PARAMETER RIGHT to continue editing User Presets. The changes to the Speaker Simulator User Presets are saved automatically.

MIDI SETUP MENU This sub-menu contains all of the functions for setting external communications for the GSP-21; Continuous control pedals, MIDI in and out, and Program parameter exporting. Press PARAMETER DOWN to enter the first sub-menu item:

SELECT MIDI RECEIVE CHANNEL

MIDI Receive
Channel 1

(example)

The GSP-21 can receive data from 16 MIDI channels coming through the MIDI input jack from devices which send MIDI data.

Press the PARAMETER UP or DOWN button to select channel 1 through 16, or channels 1 to 16 simultaneously (omni), or "Disabled". MIDI data is received on the indicated channels at all times unless "Disabled" is selected.

Press the RIGHT PARAMETER button to go to the next utility function, or LEFT PARAMETER button to go to the previous utility function.

MIDI PROGRAM RECEIVE MAP

The GSP-21 can respond to Program Change instructions from keyboards, sequencers, or other MIDI controller. Programs on the GSP-21 are changed at the same time program changes are made on the MIDI controller.

Use this utility to select which GSP-21 program is called up when the MIDI program number is changed.

For example, the synthesizer may use program 12 for a trumpet sound, but the effects that go with this sound are on program 123 of the GSP-21. Set the MIDI link table to read:

Prg Receive Map
MIDI 12 -> GSP 123

Set this way, whenever the GSP-21 receives a MIDI Program 12 on the selected MIDI receive channel, the GSP-21 will change to program number 123.

When this utility is selected, the cursor is under the number immediately following the MIDI on the bottom line. Press the PARAMETER UP and DOWN buttons to change the MIDI program numbers and look at the linkages. From the factory, all linkages are set so MIDI programs 1 through 128 are linked to GSP-21 programs 1 through 128.

To change a linkage, push the PARAMETER RIGHT button. The cursor moves to the GSP-21 program number on the bottom line. Change the program number using the PARAMETER UP and DOWN buttons.

After creating the desired linkages, press the RIGHT PARAMETER button to go to the next utility function.

SELECT MIDI TRANSMIT CHANNEL

The GSP-21 can transmit MIDI data on one of the 16 MIDI channels through its MIDI Out port. Upon selecting this utility, the display will show "MIDI Transmit Channel 1". Press the PARAMETER UP or DOWN button to select channels 1 through 16, or "Disabled".

MIDI data will be transmitted on the selected channel whenever a program change is made from either the GSP-21 Foot Controller or the optional Studio Remote controller, unless "Disabled" is selected.

Press the PARAMETER RIGHT or LEFT button to go to the next or previous Utility function, or press UTILITY to exit the Utility mode.

MIDI PROGRAM TRANSMIT MAP

Use this utility to select which MIDI Program is sent when a GSP-21 program is selected from the GSP-21 Foot Controller or the optional; Studio Remote Controller. Data will be sent on the selected MIDI Transmit channel

For example if the link is set as follows:

Prg Transmit Map GSP <u>134</u> -> MIDI 28	(example)
---	-----------

then whenever the GSP-21 program 134 is selected with either of the available remote controllers, a MIDI Program Change 28 will be sent on the selected MIDI Transmit channel.

When this utility is selected, the cursor is under the number immediately following "GSP" on the bottom line of the display. Press PARAMETER UP or DOWN to select the program number on the GSP-21 which you want to link to a MIDI Program number for transmitting. Then press PARAMETER

RIGHT to move the cursor to the number next to "MIDI" on the display, and use PARAMETER UP or DOWN to select the MIDI Program number that will be sent when the GSP-21 program is selected.

Press the PARAMETER RIGHT or LEFT button to go to the next or previous Utility function, or press UTILITY to exit the Utility mode.

CHANGE GLOBAL MIDI CC LINKS

This function links any one GSP-21 effect parameter to a MIDI continuous controller (CC). For example, if the volume (normally CC 7) on the MIDI controller is increased, the GSP-21 can be programmed to automatically increase the reverb level. Here, "Global" means that the link is valid in all programs.

When this utility is selected, the display reads:

Accent Delay Not Linked Global

This shows that the accent delay is not linked to any CC. With the cursor on the top line, under the A, press the UP or DOWN PARAMETER button to show other effect parameters and their links. The parameters are listed in alphabetic order. The GSP-21 comes from the factory with no CC links; all links must be assigned by the user.

To link effect parameters to CC's, decide which effect should be linked to which CC. A list of standard MIDI CC's is in Appendix E.

Press the UP or DOWN PARAMETER button to select the desired effect parameter. Press the RIGHT button and the cursor moves to the bottom line, under "Not Linked". Press the UP or DOWN PARAMETER button to select a CC.

There are 128 CC's, plus channel pressure (ChP). Channel pressure is like a trumpet player or drummer playing harder or softer.

After creating the desired linkages, press the RIGHT PARAMETER button to go to the next utility function.

The display will show:

Distortion to CC 5 Prg 1

CHANGE FIRST AND
SECOND LOCAL MIDI CC
(Continuous Controller)
LINKS

Two local CC links (First and Second) are possible **per program**. These are links which are only valid in a specific program. Setup of these local links is similar to the Global Links described in the previous section. The following differences should be noted:

1. The linkable parameters are listed in the order in which they appear in the program selected. Depending on which program you were in when you entered the Utility mode, the parameters will be different for the local link.
2. After you set up the first local link, pressing PARAMETER RIGHT will move you to the second link setup menu.
3. Remember, these links are valid only for the program number shown at the bottom right of the display. For links valid for ALL programs, set up the Global CC Link as described in the previous section.

Press the PARAMETER RIGHT button at the end of the second Local CC Link to go to the next or previous Utility function, or press UTILITY to exit the Utility mode.

DUMP MIDI DATA
(ALL PROGRAMS)

This utility sends all the GSP-21 programs to a MIDI computer, a MIDI recorder or to another GSP-21.

When selected, the display reads:

Dump MIDI Data?
Press ↑ for Yes

Make sure the receiving device is properly connected to the GSP-21 MIDI out jack and both devices are using the same MIDI channel, then press the PARAMETER UP button. The display will show the message "Transmitting".

To skip this utility, press the RIGHT PARAMETER button.

DUMP A SINGLE
PROGRAM

This utility sends the current GSP-21 program to a MIDI computer, a MIDI recorder or to another GSP-21. This is a great way to copy a user program off someone else's GSP-21.

When selected, the display will ask if it should dump MIDI data. Make sure the receiving device is properly connected to the GSP-21 MIDI out jack and both devices are using the same MIDI channel, then press the PARAMETER UP button. The display will show the message "Transmitting".

To skip or exit this utility, press the RIGHT PARAMETER button, then UP to return to the Utility Menu.

SETTING UP FOOT CONTROLLER

The GSP-21 can be used with both the foot controller and the optional Studio Remote controller. See "Optional Remote Controller" (page 22)

Setting FC Mode (Five Patch or Ten Patch)

Press PARAMETER DOWN at the Foot Controller Setup Menu to reach this utility, which sets the Foot Controller Modes between the Five Patch mode and the Ten Patch mode. When in Ten Patch Mode, the Effects Bypass Switches (6 through 0) will be used for patch selection, and not for effects bypass. Press PARAMETER UP or DOWN to change between the two modes, and press PARAMETER RIGHT to go to the Programming Sets and Patches menu.

Programming Sets and Patches

To set up the foot controller Sets and Patches, enter this utility and the display will show:

Set 1 Patch 1 is Program 1	(example)
-------------------------------	-----------

This means that when the Patch 1 button is pushed on the Foot Controller, if Set 1 is selected, the GSP-21 will change to Program 1.

With the cursor under the "1" following "Set", press PARAMETER UP or DOWN to select one of the 10 Sets. Notice as you cycle through the Set numbers, the programs assigned to Patch 1 in that Set are shown on the bottom line of the display.

Once the Set is selected, press PARAMETER UP or DOWN to select one of the five Patches. As the Patches are cycled through, notice that the program number assigned to that Patch in the current Set is shown.

Once the Patch is selected, press PARAMETER RIGHT to move the cursor to the program number. Now use PARAMETER UP or DOWN to choose a GSP-21 program number for the Patch. Since there are ten Sets of five Patches each, up to fifty Patches are available for one-button remote selection.

After setting the Foot Controller configuration, press the RIGHT and then UP PARAMETER buttons to go to the next Utility Menu function.

RESTORE UNIT to Factory Presets This utility restores all factory MIDI linkages, deletes all user programs and clears out all footswitch patches.

When selected, the display reads:

Restore Presets?
Press ↑ for Yes

If the PARAMETER UP button is pressed, the display gives the following warning:

OK to destroy
all data?

Press PARAMETER UP to confirm, or press any other front panel button to cancel the restore command. Then press the PARAMETER RIGHT and then UP buttons go to the next Utility Menu function.

SOFTWARE VERSION This function displays the software version installed on the GSP-21. The display will read:

DigiTech GSP-21
Version 1.0

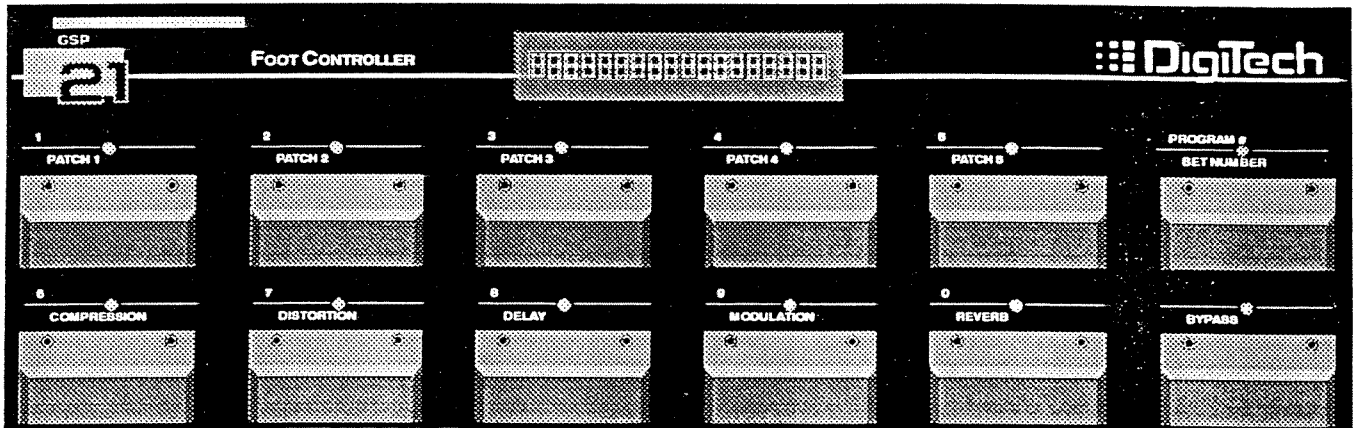
This is mostly for servicing information. DigiTech reserves the right to upgrade software at any time without incurring any obligation to install the same upgrades on products previously manufactured. See "Warranty".

CHANGE LCD CONTRAST This utility changes the contrast on the liquid crystal display. When selected, the display reads:

LCD Contrast (example)
1

Press the PARAMETER UP or DOWN buttons to change the contrast from 1 to 10. When finished, press the RIGHT PARAMETER button to go to the next utility function.

THE FOOT CONTROLLER



DISPLAY The 20 character vacuum fluorescent display is divided into two areas: the first three characters display the program number of the current patch, and the right-most sixteen characters display the title of the patch. The title mirrors the title that is stored in the main unit. In some modes, the display will issue prompts to the user rather than the program title.
(Due to incompatibilities of the display types, certain characters look different on the Foot Controller display than on the front panel of the GSP-21).

BYPASS The rightmost switch in the lower row bypasses the entire unit, the same way as the front panel BYPASS switch. The BYPASS LED will light while the unit is bypassed.

OPERATING MODES The GSP-21 Foot Controller operates in two modes, Five Patch and Ten Patch modes. The function of most of the pedal switches depends on the current mode of operation. Choosing the mode that you want to use is done through the Utility menu (page 13).

FIVE PATCH MODE Patch 1 — Patch 5

These switches access any of five pre-programmed Patches from the current SET. The LED above the selected switch will light to indicate the current Patch. If a PATCH switch is pressed when the corresponding Patch is already selected, the last Patch used will become the current Patch. In addition to choosing specific Program numbers, PATCH switches may be programmed to perform the repeat hold function.

There are 10 SETS of PATCHES available. To change to a different SET number, press the PROGRAM #/ SET NUMBER switch **twice**, then select a SET number with one of the numbered switches (1 to 0)

Lower Row Switches When in Five Patch mode, the lower five numbered switches enable and disable the indicated effect if that effect is available in the current Patch. The LED above the EFFECT switch will light if the effect is active. If an effect is selected which is not available in the current Patch, the LED will flash to indicate that the effect is not available.

TEN PATCH MODE

Numbers 1 - 0 In this mode, each of the numbered switches becomes a PATCH. The rest of the functioning is the same as described in the Patch 1 - Patch 5 section, except that the Effects Bypass function is not available on the lower switches.

PROGRAM NUMBER

RANDOM ACCESS

Numbers 1 - 0 To randomly access any program in the GSP-21, press the PROGRAM # / SET NUMBER switch **once**. The display will show:

Program number?

Enter the number of the program you wish to select.

For example, to choose program 45:

- Press PROGRAM # / SET NUMBER once
- Display reads "Program number?"
- Press numbered switches, in order, 0 - 4 - 5

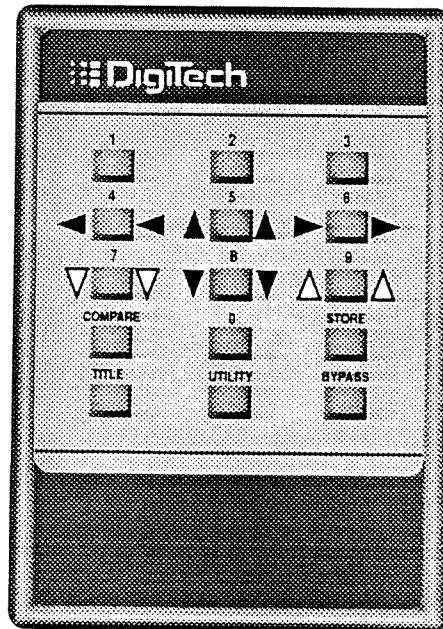
The GSP-21 will go to program 45, then automatically return to the current PATCH mode.

Note: if you press just the two digits of a two digit program number (such as 4 - 5 without the preceding zero for program 45), the GSP-21 will wait for about 5 seconds, then go to the program number.

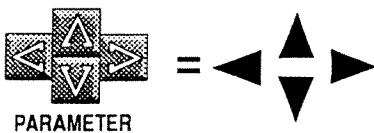
PROGRAMMING

All programming for the GSP-21 Foot Controller is done through the GSP-21 front panel programming buttons in the Utility mode. The Foot Controller menu in the Utility Menu allows the user to assign any program, or the repeat hold function, to any of the Five or Ten Patches in each of the ten Sets, giving a total of fifty or one hundred patches. See the Utility Menu section of the manual (page 13) for details of programming in the Utility mode.

THE REMOTE CONTROLLER (OPTIONAL)



The optional 15-button studio remote control has the same functions as the front panel controls, with an added feature: numerical program selection.



The buttons with solid arrows beside them are the same as the PARAMETER UP, DOWN, LEFT and RIGHT buttons.



Buttons with hollow arrows beside them are the same as the PROGRAM UP and DOWN buttons. See "Programming" (page 9).

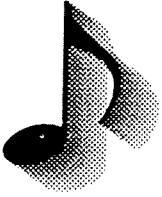
In addition, there are COMPARE, STORE, TITLE, UTILITY and BYPASS buttons (see the sections for each button). These functions allow a console operator to change effects without disturbing a performance.

By pressing buttons 0 through 9, programs can be called up by program number. Because the DSP has 128 programs, three-digit numbers must be used. For example, to select program 1, press "001". To select program 47, press "047".

If only two digits (such as "12") are pressed, the GSP-21 has a "smart" feature which will wait a short time for a third digit to be pressed, then changes to program 12. This only works if the first number is 0, 1 or 2. For best results, always use three digits to punch up a program number.

EFFECTS & THEIR PARAMETERS

The GSP-21 is a highly-complex processor which converts analog signals into digital code. Computer circuitry manipulates this digital code to create unlimited sound effects, then converts the output signal back to analog. Up to four digital effects can be used simultaneously.



REVERB

Reverberation is the repeated reflection of sound off surfaces in an enclosed space. The GSP-21 provides 15 programmable reverb parameters. These parameters have been preset to create four sounds:

REVERB EFFECTS

Rev1 (Small Room)

Imitates the feel of being in a small room, directly opposite the sound source. The reverb has a short decay time.

Rev2 (Large Room)

Simulates the acoustic environment of a large room or hall. A large room has more diffusion and a longer decay time than smaller rooms because the sound travels farther.

Gated Reverb

Reverb effect that decays for a determined length of time, then cuts off abruptly; like an electronic gate that closes quickly when the signal falls below an adjustable level.

Reverse Reverb

Normal reverb is loud following the initial sound, then decays. With reverse reverb, the decay is heard after the initial sound, then reverb builds and cuts off.

Ultimate Reverb

Has 11 parameters that give you the ability to tailor any aspect of the reverberation — simulate any reverberant space.

REVERB PARAMETERS

(note: Not all Reverbs contain all parameters)

Reverb Decay Time

Amount of time for the reverb effect to decay 60 dB (RT60).

Reverb Pre-Delay Time

Time between the original sound and the first delayed sound of the reverb effect.

Reverb Level

Relative internal level of the reverb effect.

Early Reflection Diffusion

Amount of diffusion of the early reverb, which dissipates and becomes subsequent reverb. This parameter affects the Subsequent Reverb Diffusion.

Early Reflection Delay

Amount of pre-delay for the early reverb. Generally set from 0-20 msec and always less than the Subsequent Reverb Delay for natural sound.

Early Reflection Level	Relative internal amplitude of the early reverb. Set two or three levels above the Subsequent Reverb Level to simulate being near the sound source. Set it lower to give the impression of being far from the sound source.
Subsequent Reverb Diffusion	Amount of diffusion in the subsequent reverb. Set high for longer decay times to smooth a grainy or fluttery sound. Set low for short decay times to avoid a metallic ringing.
Subsequent Reverb Delay	Amount of pre-delay for the subsequent reverb only. Generally a higher value than the Early Reflection Delay.
Subsequent Reverb Level	Relative internal level of the subsequent reverb. Use with the Early Reflection Level to give a near or far sound.
Envelopment	Width and depth of the stereo image. Set high for a wide, surrounding stereo image. Set low for a tight image that sounds like it's in front of the listener.
Damping	Amount of high frequency absorption in the subsequent reverb. As sound is diffused by reflection, the high frequencies are lost faster than the low ones. Set high to simulate soft absorptive surfaces, such as drapes and carpet. Set low to simulate hard reflective surfaces such as concrete or steel.
Accent Envelope	Places the end accent of the gated or reverse reverb effect before, at or after the end of the gated or reverse reverb decay.
Accent Amplitude	Strength of the delayed accent at the end of the gated or reverse reverb effect.
Normalized Reflectivity	Reflectivity of surfaces in the the simulated listening environment. Set high for reflective surfaces; low for absorptive surfaces. Different from Damping because it controls reflection at all frequencies. Damping controls only high frequencies.
Normalized Room Volume	Volume of the simulated listening environment. Set low (0.1) for a bathroom sound; high (1.0) for a huge train station.
	The reverb decay time (RT60) can be calculated by multiplying with the Normalized Reflectivity. For example, if Normalized Volume is set to 0.7 and Normalized Reflectivity is 3.4, then:
	$RT60 = 0.7 \times 3.4 = 2.38 \text{ secs.}$

DELAY Delay is the time between the original signal and an echo. There is an infinite repeat function, Repeat Hold, which can be activated by the Foot Controller. The GSP-21 provides Delay and Multi-Tap Delay effects with five programmable delay parameters:



DELAY PARAMETERS

Delay Range

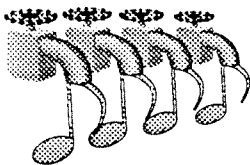
Amount of delay time between echoes. Shortest delays provide a double or quick slap effect. Longer delays create an echo effect. There are three ranges:

0 - 40 msec	1 ms steps
45 - 400 msec	5 ms steps
410 - 750 msec	10 ms steps

Delay Level Relative internal strength of the delay effect.

Feedback Amount of signal internally feedback in the delay. Feedback repeats the echo.

Multi-Tap Delay Time Amount of time between multi-tap delay taps.



**Multi-Tap
Feedback
Delay**

Delay time of the tap that is fed back in the multiple-delay effects.

MODULATION

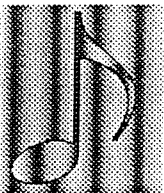
Pitch is the vibration frequency of a tone. For example, a tone can be high- or low-pitched. The GSP-21 has nine programmable pitch parameters. Pitch can be dynamically altered in two basic ways:



**MODULATION
EFFECTS**

Chorus

Simulates a chorus of instruments playing at different tones. Created by splitting the signal, detuning and using a long delay on one, then joining it with the original.



Flanging

Classic sweeping "jet-airplane" effect originally produced by slowing tape reels by pressing against the flanges. The GSP-21 creates flanging by splitting the signal, using feedback and a small delay time on one half, then joining it with the original.

**MODULATION
PARAMETERS**

Speed

Low Frequency Oscillator (LFO) sweeping speed of the delay tap across the set delay time. Adjusts the amount of pitch shifting in both chorus and flange effects.

Depth

Amount of LFO delay time travelled by the delay tap. Adjusts the depth of pitch alteration.

Chorus Delay

Time delay of the chorus effect.

Chorus Level

Relative internal level of the chorus effect.

LFO Waveform

The LFO changes the delay time in a regular, repeating wave. Its waveform can be set to one of three shapes:

1. Sawtooth
2. Sine wave
3. Logarithmic

Flange Feedback

Amount of flange effect fed back into the original signal. More feedback will give a sharper, more metallic flanging sound.

Flange Feedback Phase

Feedback can be set to sum with positive or negative phase.

Flange DelayTime

Time delay of the flange effect.

Flange Level

Relative internal level of the flange effect.

EQUALIZATION

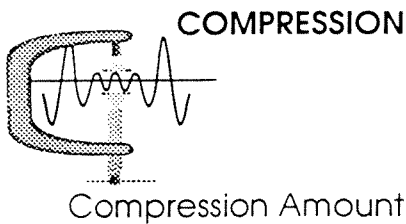


Equalization is used to compensate for frequency deficiencies and to control an instrument's tonal qualities.

The GSP-21 provides a seven-band programmable equalizer. Frequencies can be adjusted within the following bandwidths:

- Bass (63 Hz to 250 Hz),
- Midrange (500 Hz to 2 kHz), and
- Treble (4 kHz to 16 kHz).

Each of the seven bands is adjustable in 1 dB steps from 12 dB of cut to 12 dB of boost.

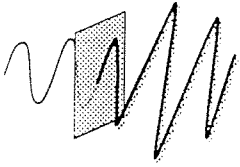


Compression is an effect which adjusts the source's dynamic range (the difference between the loudest and quietest sounds). By compressing the range, notes can be sustained longer and the sound will be tighter.

Varies the amount of compression. A low setting gives a full, natural-sounding dynamic range. A high setting provides a tight heavy metal sound.

DISTORTION EFFECTS

Rock Tube Emulates the warm, rich sound created by tube amplifiers.



Metal Tube Creates the heavy metal sound used by many popular groups.

Overdrive Similar to tube distortion with an added over-driver, high-gain punch.

Heavy Sustain The ultimate in crunchy sustain

DISTORTION PARAMETERS

Balls Controls the amount of gain (overdrive) of the distortion.

Distortion Level



ENHANCER This effect enhances various parts of the signal so your playing can "cut through" better.

ENHANCER PARAMETER

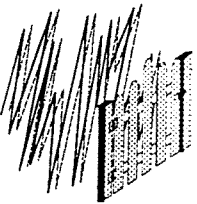
Enhancer amount Sets the amount of enhancing added to your signal.

NOISE GATE Gates, or shuts off, the output when the input signal falls below a certain level. Useful for eliminating random noises when you're not playing.

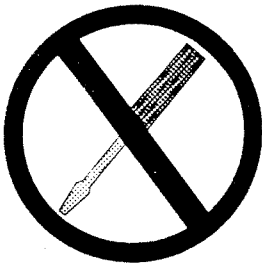
NOISE GATE PARAMETER

Gate Threshold

Sets the threshold (signal level) below which the noise gate "kicks in" and attenuates the signal. The lower the threshold is set, the longer a sustain will hold while fading out, but the more hum or finger noise from your guitar or other effects might get through while you're not playing.



MAINTENANCE AND SERVICE



Keep the GSP-21 clean by occasionally dusting the cover and wiping the front panel with a dry cloth. Periodically check the wires and connectors on the back of the unit to make sure they are not crimped or frayed.

There are no user-serviceable parts inside the GSP-21. Opening the chassis for any reason will void the warranty.

The GSP-21 is equipped with a battery which keeps all user-defined programs in memory when the unit is unplugged and transported. This battery should last about six years. If the unit is turned on and the user programs are gone, take it to the dealer for battery replacement.

All service and repair must be performed by the factory for the warranty to remain in effect. Should a problem arise with the GSP-21, contact a DigiTech dealer for repair procedures.

ACRONYMS AND ABBREVIATIONS

A-D	Analog-to-Digital
CC	Continuous Controller
ChP	Channel Pressure
GSP	Guitar Signal Processor
EQ	Equalization
FCC	Federal Communications Commission
HISC	Happenin' Instruction Set Computer
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
LFO	Low-Frequency Oscillator
LSB	Least Significant Byte
MIDI	Musical Instrument Digital Interface
MSB	Most Significant Byte
msec	milliseconds
PCM	Pulse-Code Modulation
rms	root mean square
RT60	Reverb Time 60 dB
SNR	Signal-to-Noise Ratio
THD	Total Harmonic Distortion
T-R-S	Tip-Ring-Sleeve
VLSI	Very-Large-Scale Integrated chip

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits of a Class B computing 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:

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

- 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.

SPECIFICATIONS

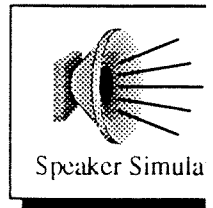
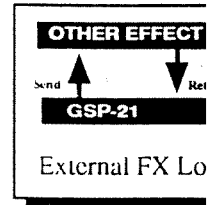
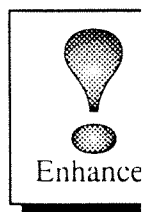
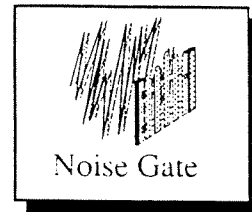
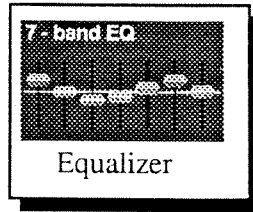
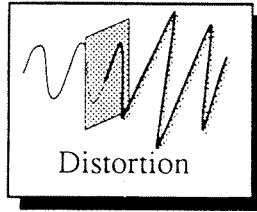
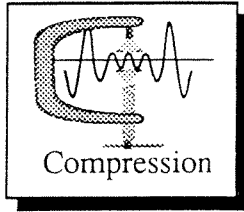
Maximum Input:	+18 dBv (ref 0.775vrms)
Maximum Output:	+18 dBv (ref 0.775vrms)
Input Control:	+12 dB from center , +4 to -20 dBv nominal level
Output Control:	+12 dB from center , +4 to -20 dBv nominal level
Input Impedance:	40k ohm stereo, 20k ohm mono
Output Impedance:	51 ohm
THD:	Less than 0.08% at 1 kHz
Resolution:	16-bit linear PCM conversion
SNR:	88 dB nominal
Dry Freq. Resp:	20 Hz to 20 kHz +0.5 dB
Wet Freq. Resp:	20 Hz to 20 kHz +0, -3 dB
A-D Converter:	16-bit
Dimensions:	1.75" H x 19" W x 8.5" D (44mm x 483mm x 216mm)
Weight:	5.5 lbs (2.5 kg)

APPENDIX A

EFFECT CONFIGURATIONS

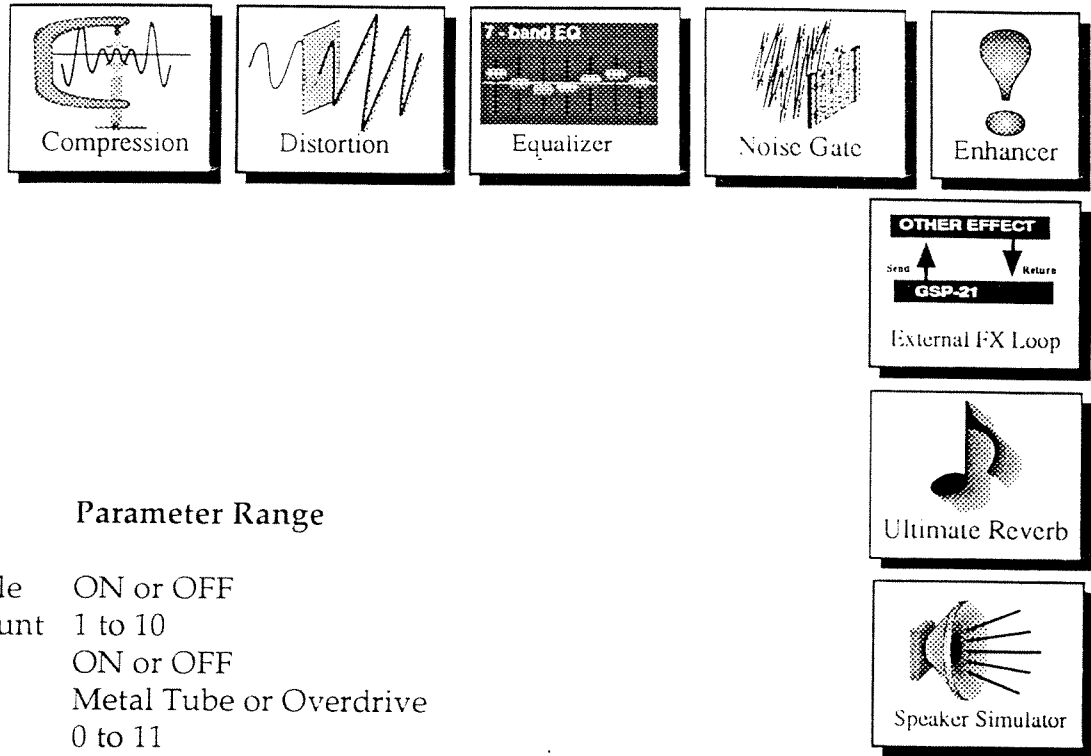
The GSP-21 has ten programmable effects configurations, using different combinations of 21 unique effects. The effects configurations are graphically depicted in the illustrations above each. By altering the parameters of the configurations, 128 preset programs have been created (see Appendix B). The parameters can also be modified to create 128 user programs, which can be logged in Appendix C.

1 Cmp + Ds + Eq + NG + E + L + SS



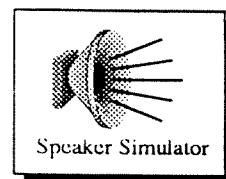
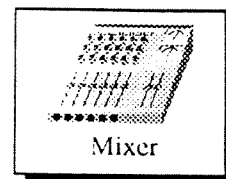
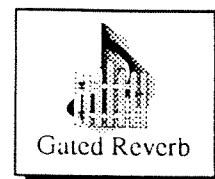
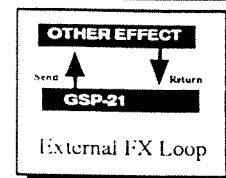
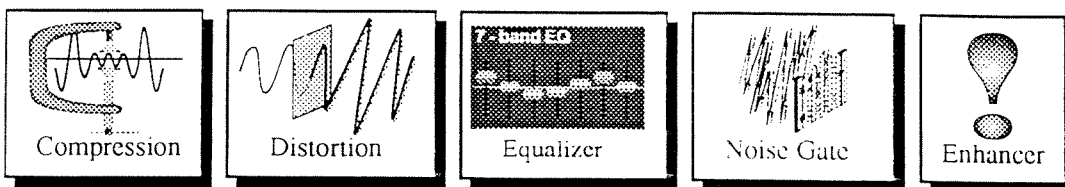
Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	

2 Cmp + Dst + Eq + NG + E + L + UltrV + SS



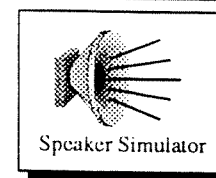
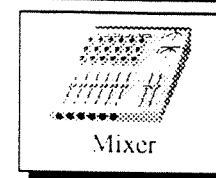
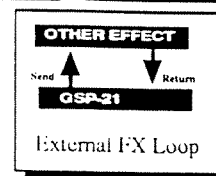
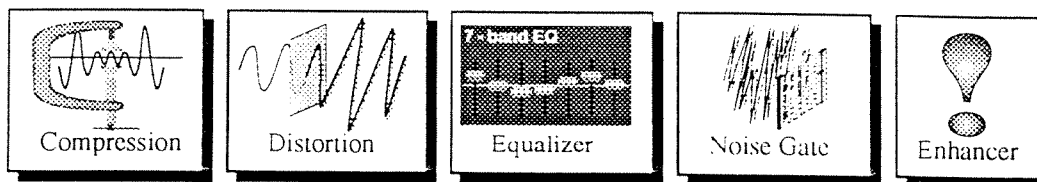
Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Dry Level	1 to 10
Reverb Enable	ON or OFF
Early Reflect Level	1 to 10
Subsequent Level	1 to 10
Normal Reflectivity	1.0 to 99 seconds
Normal Room Volume	0.1 to 10
Damping Factor	1 to 10
Envelopment	1 to 10
Subsequent Delay	0 to 80 milliseconds
Subsequent Diffusion	1 to 10
Early Delay Time	0 to 80 milliseconds
Early Diffusion	1 to 10

3 Cmp + Dst + Eq + NG + E + L + GtRv + Mx + SS



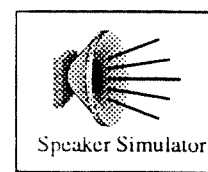
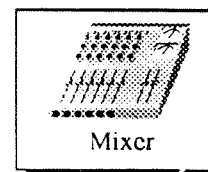
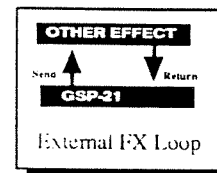
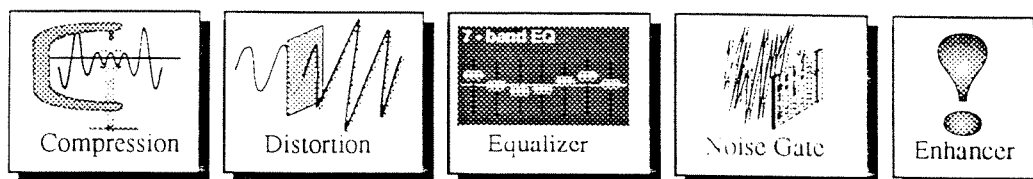
Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Reverb Enable	ON or OFF
Reverb Pre-Delay	0 to 80 milliseconds
Gate Envelope	Flat or Decaying
Gate Decay Time	50 to 600 milliseconds
Accent Delay Time	-50 to +50 milliseconds
Mix: Dry R Level	0 to 10
Mix: Dry L Level	0 to 10
Mix: Accent Right	0 to 10
Mix: Accent Left	0 to 10
Mix: Gate Right	0 to 10
Mix: Gate Left	0 to 10

4 Cmp + Dst + Eq + NG + E + L + RvRv + Mx + SS



Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Reverb Enable	ON or OFF
Reverb Pre-Delay	0 to 80 milliseconds
Reverse Time	50 to 600 milliseconds
Accent Delay Time	-50 to +50 milliseconds
Mix: Dry R Level	0 to 10
Mix: Dry L Level	0 to 10
Mix: Accent Right	0 to 10
Mix: Accent Left	0 to 10
Mix: Reverse R Level	0 to 10
Mix: Reverse L Level	0 to 10

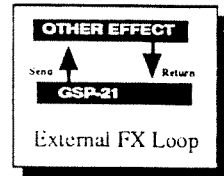
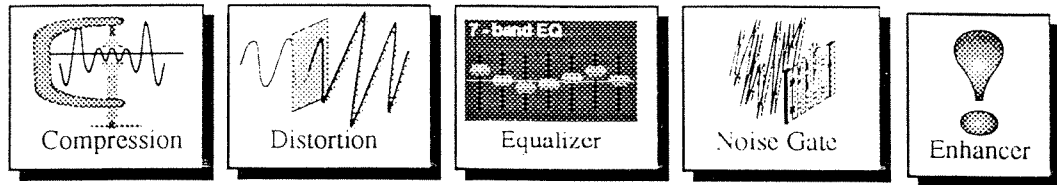
5 Cmp + Dst + Eq + NG + E + L + Ch + D + Rv1 + Mx + SS



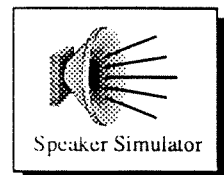
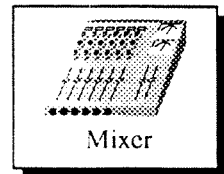
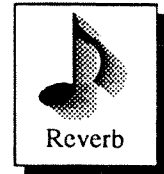
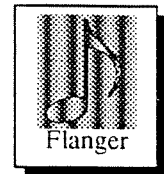
Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Chorus Enable	ON or OFF
Chorus Delay	0 to 60 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
LFO Waveform	Sine wave, Sawtooth wave, Logarithmic wave

Digital Delay Enable	ON or OFF	Reverb Filter	Bright, Soft or Warm
Delay in: Dry	0 to 10	Reverb Decay	100 to 1200 milliseconds
Delay in: Chorus	0 to 10	Mix: Dry Level	0 to 10
Delay Time	0 to .75 seconds	Mix: Chorus R Level	0 to 10
Delay Feedback	0 to 99 percent and Repeat Hold	Mix: Chorus L Level	0 to 10
Reverb Enable	ON or OFF	Mix: Delay R Level	0 to 10
Reverb In: Dry	0 to 10	Mix: Delay L Level	0 to 10
Reverb In: Chorus	0 to 10	Mix: Reverb R Level	0 to 10
Reverb In: Delay	0 to 10	Mix: Reverb L Level	0 to 10
Reverb Pre-Delay	0 to 80 milliseconds		

6 Cmp + Dst + Eq + NG + E + L + Fl + D + Rv1 + Mx + SS

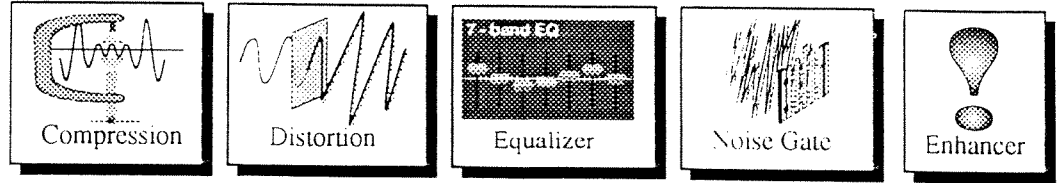


Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Flange Enable	ON or OFF
Flange Delay	0 to 10 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
Flange Feedback Phase	Negative or Positive
Flange Feedback	0 to 99 %
Digital Delay Enable	ON or OFF
Delay in: Dry	0 to 10
Delay in: Flange	0 to 10
Delay Time	0 to .75 seconds
Delay Feedback	0 to 99 % and Repeat Hold
Reverb Enable	ON or OFF
Reverb In: Dry	0 to 10
Reverb In: Flange	0 to 10
Reverb In: Delay	0 to 10
Reverb Pre-Delay	0 to 80 milliseconds
Reverb Filter	Bright, Soft or Warm

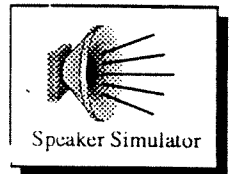
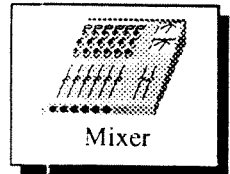
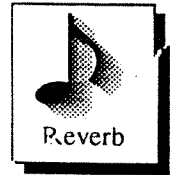
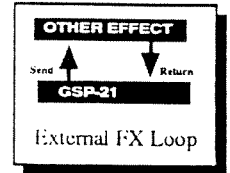


Reverb Decay	100 to 1200 milliseconds
Mix: Dry Level	0 to 10
Mix: Flange R Level	0 to 10
Mix: Flange L Level	0 to 10
Mix: Delay R Level	0 to 10
Mix: Delay L Level	0 to 10
Mix: Reverb R Level	0 to 10
Mix: Reverb L Level	0 to 10

7 Cmp + Dst + Eq + NG + E + L + Ch + D + Rv2 + Mx + SS

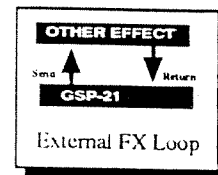
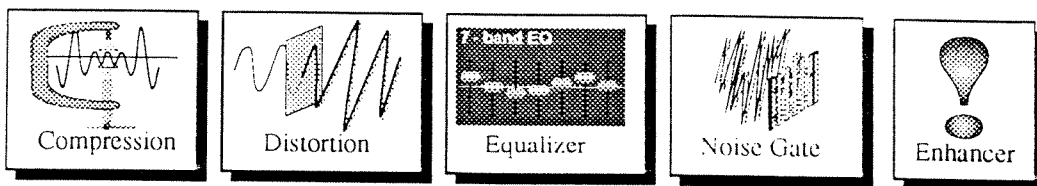


Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	
Chorus Enable	ON or OFF
Chorus Delay	0 to 60 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
LFO Waveform	Sine wave, Sawtooth wave, Logarithmic wave

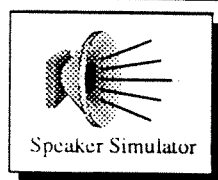
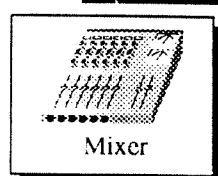
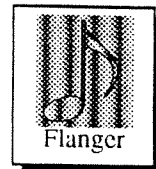


Digital Delay Enable	ON or OFF		
Delay in: Dry	0 to 10		
Delay in: Chorus	0 to 10	Reverb Filter	Bright, Soft or Warm
Delay Time	0 to .75 seconds	Reverb Decay	1 to 20 seconds
Delay Feedback	0 to 99 percent and Repeat Hold	Mix: Dry Level	0 to 10
		Mix: Chorus R Level	0 to 10
Reverb Enable	ON or OFF	Mix: Chorus L Level	0 to 10
Reverb In: Dry	0 to 10	Mix: Delay R Level	0 to 10
Reverb In: Chorus	0 to 10	Mix: Delay L Level	0 to 10
Reverb In: Delay	0 to 10	Mix: Reverb R Level	0 to 10
Reverb Pre-Delay	0 to 60 milliseconds	Mix: Reverb L Level	0 to 10

8 Cmp + Dst + Eq + NG + E + L + Fl + D + Rv2 + Mx + SS

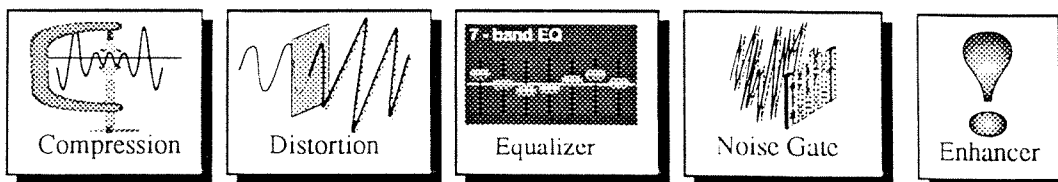


Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Flange Enable	ON or OFF
Flange Delay	0 to 10 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
Flange Feedback Phase	Negative or Positive
Flange Feedback	0 to 99 %
Digital Delay Enable	ON or OFF
Delay in: Dry	0 to 10
Delay in: Flange	0 to 10
Delay Time	0 to .75 seconds
Delay Feedback	0 to 99 % and Repeat Hold
Reverb Enable	ON or OFF
Reverb In: Dry	0 to 10
Reverb In: Flange	0 to 10
Reverb In: Delay	0 to 10



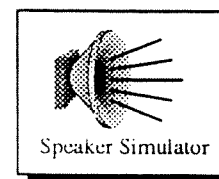
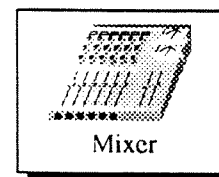
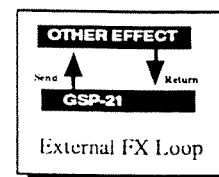
Reverb Pre-Delay	0 to 60 milliseconds
Reverb Filter	Bright, Soft or Warm
Reverb Decay	1 to 20 seconds
Mix: Dry Level	0 to 10
Mix: Flange R Level	0 to 10
Mix: Flange L Level	0 to 10
Mix: Delay R Level	0 to 10
Mix: Delay L Level	0 to 10
Mix: Reverb R Level	0 to 10
Mix: Reverb L Level	0 to 10

9 Cmp + Dst + Eq + NG + E + L + Ch + 4TD + Mx + SS

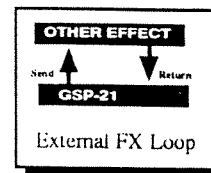
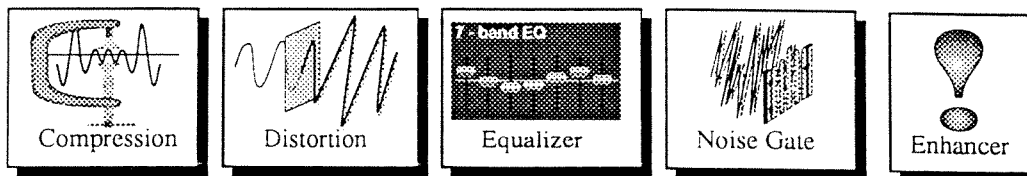


Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Chorus Enable	ON or OFF
Chorus Delay	0 to 60 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
LFO Waveform	Sine wave, Sawtooth wave, Logarithmic wave

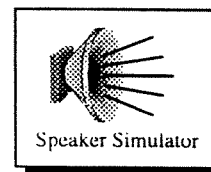
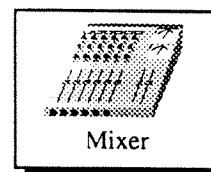
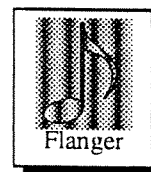
Digital Delay Enable	ON or OFF	Mix: Dry Level	0 to 10
Delay in: Dry	0 to 10	Mix: Chorus Level	0 to 10
Delay in: Chorus	0 to 10	Mix: Tap1 R Level	0 to 10
Delay Time: Tap1	0 to 1.5 seconds	Mix: Tap1 L Level	0 to 10
Delay Time: Tap2	0 to 1.5 seconds	Mix: Tap2 R Level	0 to 10
Delay Time: Tap3	0 to 1.5 seconds	Mix: Tap2 L Level	0 to 10
Delay Time: Tap4	0 to 1.5 seconds	Mix: Tap3 R Level	0 to 10
Delay Time: Feed	0 to 1.5 seconds	Mix: Tap3 L Level	0 to 10
Delay Feedback	0 to 99 percent and Repeat Hold	Mix: Tap4 R Level	0 to 10
		Mix: Tap4 L Level	0 to 10



10 Cmp + Dst + Eq + NG + E + L + FI + 4TD + Mx + SS



Effects Parameter	Parameter Range
Compression Enable	ON or OFF
Compression Amount	1 to 10
Distortion Enable	ON or OFF
Distortion Type	Metal Tube or Overdrive
Distortion Balls	0 to 11
Graphic EQ Enable	ON or OFF
63 Hz Band	12 dB in 1 dB steps
160 Hz Band	12 dB in 1 dB steps
400 Hz Band	12 dB in 1 dB steps
1 kHz Band	12 dB in 1 dB steps
2.5 kHz Band	12 dB in 1 dB steps
6.3 kHz Band	12 dB in 1 dB steps
16 kHz Band	12 dB in 1 dB steps
Enhancer Enable	ON or OFF
Enhancer Amount	1 to 10
Noise Gate Enable	ON or OFF
Gate Threshold	1 to 10
Effects	Inserted or Bypassed
External FX Loop	ON or OFF
Flange Enable	ON or OFF
Flange Delay Time	0 to 10 milliseconds
LFO Sweep Speed	0 to 5 Hz
LFO Sweep Depth	0 to 6.35 milliseconds
Flange Feedback Phase	Negative or Positive
Flange Feedback	0 to 99 %
Digital Delay Enable	ON or OFF
Delay in: Dry	0 to 10
Delay in: Flange	0 to 10
Delay Time: Tap1	0 to 1.5 seconds
Delay Time: Tap2	0 to 1.5 seconds
Delay Time: Tap3	0 to 1.5 seconds
Delay Time: Tap4	0 to 1.5 seconds
Delay Time: Feed	0 to 1.5 seconds
Delay Feedback	0 to 99 percent and Repeat Hold



Mix: Dry Level	0 to 10
Mix: Flange Level	0 to 10
Mix: Tap1 R Level	0 to 10
Mix: Tap1 L Level	0 to 10
Mix: Tap2 R Level	0 to 10
Mix: Tap2 L Level	0 to 10
Mix: Tap3 R Level	0 to 10
Mix: Tap3 L Level	0 to 10
Mix: Tap4 R Level	0 to 10
Mix: Tap4 L Level	0 to 10

Program Number: _____ Configuration: _____ Title: _____

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Program Number: _____ Configuration: _____ Title: _____

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Program Number: _____ Configuration: _____ Title: _____

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Program Number: _____ Configuration: _____ Title: _____

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Copy this page and record your programs' parameters

APPENDIX C

FACTORY PRESET PROGRAMS

APPENDIX D

STANDARD MIDI CONTINUOUS CONTROLLERS

CONTROLLER NUMBER	CONTROLLER FUNCTION
0	Undefined
1	Modulation wheel or lever
2	Breath controller
3	Undefined
4	Foot controller
5	Portamento time
6	Data entry MSB
7	Main volume
8	Balance
9	Undefined
10	Pan
11	Expression controller
12 through 15	Undefined
16 through 19	General purpose controllers 1 through 4
20 through 31	Undefined
32 through 63	LSB for values 0 through 31
64	Damper pedal (sustain)
65	Portamento
66	Sostenuto
67	Soft pedal
68	Undefined
69	Hold 2
70 through 79	Undefined
80 through 83	General purpose controllers 5 through 8
84 through 91	Undefined
92	Tremolo depth
93	Chorus depth
94	Celeste depth
95	Phaser depth
96	Data increment
97	Data decrement
98	Non-registered parameter number LSB
99	Non-registered parameter number MSB
100	Registered parameter number LSB
101	Registered parameter number MSB
102 through 121	Undefined
122 through 127	Channel mode messages

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APPENDIX E

DOD / DIGITECH ELECTRONICS SYSTEM EXCLUSIVE FORMAT

INTRODUCTION The DOD/DigiTech Electronics System Exclusive Format facilitates use and control of various signal processing devices manufactured by DOD/DigiTech Electronics. The format allows different types of data transfer with capability for future expansion.

Currently, a DOD/DigiTech digital signal processor can receive machine-dependent microcode, and user-programmed parameters can be received from and dumped to external devices.

Device Type 03H

Procedure Type 00H Request for program dump (all programs)
40H Download microcode
41H Download program dump (all programs)

GENERAL FORMAT

1111 0000	System-exclusive status byte
0000 0000	DOD/DigiTech manufacturer's
0000 0000	ID number
0001 0000	(00H 00H 10H)
0000 nnnn	Unit number; nnnn + 1 equals the channel number
0ttt tttt	device type
0ppp pppp	procedure type
0ddd dddd	
0ddd dddd	Procedure data type
0ddd dddd	(128 possible)
0ddd dddd	
1111 0111	End-of-exclusive status byte

DEFINITIONS

- Unit Number Internal representation of the channel to which the receiving device is listening. Used to communicate to different devices of the same type connected to a common MIDI line. This byte is ignored if the receiving device is set to omni.
- Device Type Specifies the DOD/DigiTech product receiving communication.
- Procedure Type Up to 128 procedure commands specifying which procedures within a device are to be executed. The first 64 (00H to 3FH) are universal procedures that apply to all device types. The second 64 (40H to 7FH) are specific to a particular device type.

Data Transmits data specified by the executed procedure. See "Specific Formats" for the expected data format.

(Microcode is packed into groups of four data bytes. Specific information on the GSP-21 microcode programming is proprietary information of DOD/DigiTech Electronics Corporation.)

SPECIFIC FORMATS FOR THE GSP-21

Sending Microcode to the GSP-21

- 1111 0000 System-exclusive status byte
- 0000 0000
- 0000 0000 DOD/DigiTech ID
- 0001 0000
- 0000 nnnn Unit number (+ 1 = channel)
- 0000 00XX GSP-21 device
- 0100 0000 Send to GSP-21
- 0ddd dddd Data byte 1
- 0ddd dddd Data byte 2
- 0ddd dddd (Groups of four, 128 total possible)
- 0ddd dddd
- 1111 0111 End-of-exclusive status byte

Requesting User Programming Dump (All Programs)

- Device requesting dump:
- 1111 0000 System-exclusive status byte
 - 0000 0000
 - 0000 0000 DOD/DigiTech ID
 - 0001 0000
 - 0000 nnnn Unit number (+ 1 = channel)
 - 0000 00XX GSP-21 device
 - 0000 0000 Procedure (dump all programs)
 - 1111 0111 End-of-exclusive status byte

GSP-21 dump response:

1111 0000	System-exclusive status byte
0000 0000	
0000 0000	DOD/DigiTech ID
0001 0000	
0000 nnnn	Unit number (+ 1 = channel)
0000 00XX	GSP-21 device
0100 0001	Download all programs
0ddd dddd	Data byte 1
0ddd dddd	Data byte 2
"	
"	
0ddd dddd	Data byte 3173
0ddd dddd	Data byte 3174
1111 0111	End-of-exclusive status byte

Downloading Dumped
User Programs (All
Programs)

1111 0000	System-exclusive status byte
0000 0000	
0000 0000	DOD/DigiTech ID
0001 0000	
0000 nnnn	Unit number (+ 1 = channel)
0000 00XX	GSP-21 device
0100 0001	Download all programs
0ddd dddd	Data byte 1
0ddd dddd	Data byte 2
"	
"	
0ddd dddd	Data byte 3173
0ddd dddd	Data byte 3174
1111 0111	End-of-exclusive status byte

GSP-21 MIDI IMPLEMENTATION CHART

GSP-21
DIGITECH GSP-21 GUITAR SIGNAL PROCESSOR

Date: June 1990
Version: 1.0

FUNCTION		TRANSMITTED	RECOGNIZED	REMARKS
Basic Channel	Default Changed	1 - 16 1 - 16	1 - 16 1 - 16	Memorized
Mode	Default Messages Altered	Mode 3 x	Mode 3 x	Omni Off
Note Number	True Voice	x	x	
Velocity	Note on Note off	x x	o o	
After Touch	Keys Channels	x x	o o	
Pitch Bender		x	o	
Control Change		x	o	
Program Change	True #	0 - 127	0 - 127 1 - 128	Internally mappable
System Exclusive		o	o	
System Common	Song Position Song Select Tune	x x x	x x x	
System Real- Time	Clock Commands	x x	x x	
Auxillary Messages	Local ON/OFF All Notes OFF Active Sense Reset	x x x x	x x x x	
Mode 1: Omni On, Poly Mode 3: Omni Off, Poly		Mode 2: Omni On, Mono Mode 4: Omni Off, Mono		o = Yes x = No



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