DSP 128

Digital Multiple Effects Signal Processor

Owner's Manual

DigiTech

GETTING STARTED WITH THE DSP-128

NOTICE: To get the best performance from your DSP 128 please carefully read and follow these instructions.

INSTALL

1. Mount the DSP 128 in a rack with the provided screws. Rubber feet have been affixed to the bottom corners of the unit so that you may also use the DSP 128 as a free standing unit. The rubber feet prevent marring the surfaces on which you place the unit.

PLUG IN A.C.

2. Be sure to route the power cord away from audio lines.

SELECT INPUT AND OUTPUT LEVEL RANGES

3. Set the input and output level selector switches. Select the +4 dB position for line level signals. Select the -20 dB position for instrument level signals.

PLEASE NOTE: Incorrect setting of these switches can cause either excessive noise or result in the unit being overdriven.

CONNECT CABLES

4. Connect the audio cables to the unit. The inputs and outputs of the DSP 128 will accept either balanced or unbalanced connections. Refer to the section "Making Connections" for further detail.

PLEASE NOTE: The DSP 128 is a stereo input/output signal processing device. For best performance with a mono signal source, plug the input signal into the RIGHT/MONO input and use the RIGHT and LEFT outputs. When using the DSP 128 in a mono output application, use the LEFT output. This will provide best performance when using the FLANGE or CHORUS algorithms.

ADJUST INPUT

5. Adjust the INPUT LEVEL control. Use the LED bargraph as a reference. Best performance of the unit is obtained when the green LED's are on most of the time and occasional peaks barely light the red LED.

ADJUST OUTPUT

6. Adjust the OUTPUT LEVEL control to achieve desired output level.

ADJUST MIX

7. Adjust the OUTPUT MIX control to achieve desired dry to wet ratio.

MIDI CONTROL

8. To use a MIDI controller for program changes, connect the controller MIDI OUT jack to the DSP-128 MIDI IN jack. Any device that can send MIDI patch change information such as a synthesizer, MIDI sequencer or a controller. The Digitech PDS 3500, is a MIDI controller that can be used to change programs on the DSP-128. Please refer to the section "MIDI Control of the DSP-128" for complete information of the unit's MIDI features.

FACTORY PRESETS

9. To use the factory preset programs, press only the up and down buttons to select the desired program. Please refer to the section "Programming the DSP-128" for details on modifying programs.

DSP-128 QUICK FACTORY PRESET PROGRAM REFERENCE

Prgrm Nmbrs			Description
P 1	-	P 5	Large Rooms
P 6	-	P 9	Large Rooms with Delay
P 10	-	P 13	Live Large Rooms
P 14	-	P 18	Medium Rooms
P 19	-	P 22	Medium Rooms with Delay
P 23	-	P 25	Live Medium Rooms
P 26	-	P 30	Small Rooms
P 31	-	P 36	Small Rooms with Delay
P 37	-	P 46	Gated Reverbs
P 47	-	P 53	Reverse Reverbs
P 54	-	P 56	Multi-tap Delay with Reverse Reverb
P 57	-	P 65	Halls
P 66	-	P 76	Delays
P 77	-	P 84	Multi-tap Delays
P 85	-	P 92	Chorus
P 93	-	P 94	Vibrato
P 95	-	P 98	Chorus with Delay
P 99	-	P103	Medium Rooms with Chorus and Delay
P104	-	P108	Large Rooms with Chorus and Delay
P109	-	P114	Flange
P115	-	P119	Flange with Delay
P120	-	P122	Bounce
P123	-	P126	Stereo Image
P127			Mute
P128			Dry

DigiTech - DSP 128 Owner's Instruction Manual

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NOTICE

The information contained in this document is subject to change without notice.

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INTRODUCTION TO THE DSP 128

The DSP 128 is a MIDI controllable, multi-effect digital signal processor capable of doing up to three effects simultaneously. The DSP 128 offers a wide range of reverbs, chorusing, flanging, delays and special effects. All of the parameters of each algorithm are programmable and are assignable to any MIDI continuous controller.

We at digitech designed the DSP 128 with three goals in mind:

1. Execute high quality reverberation and effects.
2. Have simplicity of operation.
3. keep the price low.

To obtain a high quality, low cost unit, we designed a unique "HISC" digital signal processing Very-Large Scale Integrated (VLSI) circuit chip. This custom VLSI chip coupled with a state-of-the-art software development system allowed us to achieve extremely robust and smooth sounding effects. To make the DSP 128 easy to use we designed an operating system for it that is both simple and powerful. An LED display on the front panel shows the operating parameters as the user selects and modifies them. A field of 12-LED's shows which effects the currently selected algorithm contains, making it easy to see what the DSP 128 is doing.

The unit is packaged in a single space, rack mountable chassis. Balanced or unbalanced inputs and outputs with independent level selector switches make it easy to interface the DSP 128 to other units. We included a MIDI OUT jack, in addition to the standard MIDI IN and MIDI THRU jacks, allowing the entire status of the machine to be saved using any midi recorder. The high quality 16-bit analog to digital converter keeps the signal to noise ratio better than 87 dB, making the DSP 128 quiet enough for the studio. The reliability built in by digitech makes it tough enough for the road.

The DSP 128 comes ready programmed with 128 preset effects programs. However, any or all of these programs can be reprogrammed by the user. To program the DSP 128, select one of the 17 effect algorithms, step through that algorithm's parameters, and change their values to get the desired sound. All changes are stored in battery backed up RAM.

When the DSP 128 is connected to the DigiTech PDS-3500 THE MIDI PEDAL or any other midi controller, all of the presets are quickly recallable. All of the operating parameters can be continuously controlled with the PDS-3500 and the FX-17 Wah/volume Controller pedal.

The DSP 128 represents a new generation of high quality, low cost digital signal processors offering complete programmability, exceptional computing power for smooth sounding effects, and MIDI compatibility for complete control. Add the power of the DSP 128 Digital Multiple Effects Signal Processor to your music.

FRONT PANEL DESCRIPTION

A. *Power On/Off Switch:* Switches power to the unit.

B. *LED Effect Function Indicators:* A field of 12 LED's that indicate the content of the current effect algorithm.

C. *Four Digit LED Display:* Displays selected program numbers, algorithm numbers, and operating parameters.

D. *Over Flow Indicator:* Indicates internal overflow of "HISC" processor. The indicator is the last "dot" or "period" on the right hand side of the four-digit LED display.

E. *Up/Down Buttons:* Modifies selected parameter.

F. *Select Button:* Selects operating parameters.

G. *Effect/MIDI Button:* Alternately turns On and OFF the effected signal. This button also puts the DSP 128 into the MIDI programming mode. To change to the MIDI mode hold this button down for 2 seconds.

H. *Output Mix Potentiometer:* Adjusts the ratio of DRY to WET signals.

I. *Output Level Potentiometer:* Adjusts the output stage gain +/-12 dB.

J. *Input Level Potentiometer:* Adjusts the input stage gain +/-12 dB.

K. *LED Headroom Indicator:* Indicates amount of headroom remaining before clipping of the input signal occurs. Carefully adjust the amount of input signal. Allowing the most signal before overload yields the best dynamic range of the unit and the quietest operation.

REAR PANEL DESCRIPTION

L. *Input Level Selector Switch:* Selects input sensitivity between *+4 dB line level* and *-20 dB instrument level.*

M. *Right and Left Input Jacks:* 1/4-inch tip-ring-sleeve phone jacks with a balanced input impedance of 40 kohms, and an unbalanced input imedance of 20 kohms. Maximum

acceptable input level is +18 dBv (ref.: 0.775 V_{rms}). Use the Right Input jack when a mono signal is input to the unit.

N. *Right and Left Dry Output Jacks:* 1/4-inch tip-ring-sleeve phone jacks. These jacks provide a "loop through" feature so that a dry signal may be sent to other effects and or equipment in an effects loop.
O. *Output Level Selector Switch:* Selects output gain between *+4 dB line level* and *-20 dB instrument level.*

P. *Right and Left Mix Output Jacks:* 1/4-inch tip-ring-sleeve phone jacks with an output impedance of 51 kohms. Maximum output level is +18 dBv into 10 kohms (ref.: 0.775 V_{rms}) or +14 dBv into 600 ohms (ref.: 0.775 V_{rms}). For the best performance, use the LEFT and RIGHT OUTPUTS, even when using a MONO signal source. Using the LEFT OUTPUT jack when using the DSP 128 in a mono only application. Do not sum the outputs for a mono feed. Summing the outputs will cause phase cancellation in some effects.

Q. *MIDI IN Jack:* A five-pin DIN jack which accepts the standard MIDI cable for receiving MIDI control data. For complete information please refer to: the MIDI IMPLEMENTATION chart in Appendix C, DEFINED MIDI CONTINUOUS CONTROLLER NUMBERS in Appendix D, and the DOD/DigiTech ELECTRONICS SYSTEM EXCLUSIVE FORMAT in Appendix E of this manual.

R. *MIDI THRU Jack:* A five-pin DIN jack which accepts the standard MIDI cable for looping through MIDI control data to other MIDI compatible devices.

S. *MIDI OUT Jack:* A five-pin DIN jack which accepts the standard MIDI cable for "dumping" of preset data with a system exclusive number code.

T. *Fuse:* 1/4-amp slo-blow, 250 MA, 250 volt. Should the fuse blow, please replace it with a fuse with the same rating. A differently rated fuse may cause the unit to be damaged.

BASIC OPERATION OF THE DSP 128

ON POWER UP

When the DSP 128 is first powered up, "P 1" appears in the LED display. This indicates that PROGRAM NUMBER ONE is active in the unit.

CHANGING PROGRAM NUMBERS

By pushing the UP button, the MIDI Program number increases by 1 until it reaches a maximum number of 128. The DSP 128 has a "wrap around" feature. When the MIDI Program number is incremented from "P128", the display "wraps around" to MIDI Program number "P 1". Also, decrementing from MIDI Program number "P 1" will "wrap around" the other way to MIDI Program number "P128".

As you change the Program number, the effect/presets also change. The effect(s) called from the memory by the MIDI Program number is indicated by different LED's lighting on the LED EFFECT FUNCTION INDICATOR. These LED's will light according to the main characteristics of each effect/preset called from the memory. The operating parameters of each effect/preset are displayed by stepping through them with the SELECT button. The function of the SELECT button will be explained in detail in the section entitled, PROGRAMMING THE DSP 128.

The factory presets and their operating parameter values are listed in Appendix B of this manual.

LEVEL AND MIX CONTROLS

Two devices set the input level to the DSP 128, the INPUT LEVEL SELECTION switch on the back of the unit, and the LEVEL control potentiometer on the front panel.

The INPUT and OUTPUT LEVEL SELECTION switches select between sources that average -20 dBm (such as guitars) and +4 dBm (such as effect loops from amplifiers and mixers). Set this switch for the type of inputs you wish to use with the unit.

The INPUT LEVEL control potentiometer on the front panel adjusts the level input to the DSP 128. This control gives you +/-12 dB of level adjustment from its center position. Carefully adjust the INPUT LEVEL control until the input signal lights the red LED on the HEADROOM indicator LED's only occasionally with the extreme peaks of the signal. This gives you the best dynamic range of the unit and the quietest operation. The red LED lights just before the unit begins to clip the signal.

The OUTPUT LEVEL control potentiometer adjust the level of the signal output from the unit. This control gives you +/-12 dB of level adjustment from its center position. Adjust this control for the optimum level for the unit that the outputs of the DSP 128 are feeding.

The OUTPUT MIX control potentiometer allows you to set the ratio of the effect-to-

original signals. This allows the DSP 128 to be used either as a stand-alone effects device for musicians or it may be used in an effects loop from a mixer or amplifier. When the OUTPUT MIX control is in the extreme counterclockwise position, only the original signal (DRY) is sent through the MIX OUTPUT at full level. When the OUTPUT MIX control is in the fully clockwise position, only the effect signal (WET) is sent through the MIX OUTPUT at full level. When the OUTPUT MIX control is in the 12 O'Clock position, the original signal (DRY) and the effect signal (WET) are mixed 50% to 50% at about half their original level and sent through the MIX OUTPUT. Use the OUTPUT MIX control to adjust the mix of the signals output from the unit.

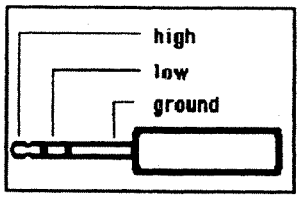
MAKING CONNECTIONS

Make all connections to the unit with 1/4-inch tip-ring-sleeve phone plugs.

For balanced wiring of the connectors:

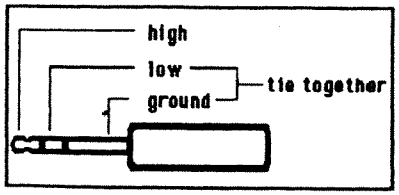
Tip: high.
Ring: low.
Sleeve: ground.

Balanced phone plug connection wiring diagram:

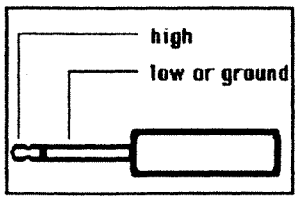


For unbalanced connection to the unit, use standard, mono 1/4-inch phone plugs, or a 1/4-inch tip-ring-sleeve phone plug wired to unbalance the connection.

For unbalanced wiring of a tip-ring-sleeve phone jack:



Unbalanced connection of a mono phone plug:



PLEASE NOTE: The DSP 128 is a stereo input/output signal processing device. For best performance with a mono signal source, plug the input signal into the RIGHT/MONO input and use the RIGHT and LEFT outputs. When using the DSP 128 in a mono output application, use the LEFT output. This will provide best performance when using the FLANGE or CHORUS algorithms.

PROGRAMMING THE DSP-128

The DSP 128 is arranged to make programming quick and easy. Using the UP, DOWN and SELECT buttons and the LED DISPLAY, you can quickly access all of the features and functions of the DSP 128.

When the unit is first powered up, it is set to program number one and the display reads "P 1". Pushing the UP or DOWN buttons increases or decreases the PROGRAM NUMBER. If you hold down the UP or DOWN buttons the rate of incrementing increases.

There are three basic elements to the programming organization of the DSP-128: the PROGRAM NUMBER, the EFFECT ALGORITHM, and the EFFECT ALGORITHM'S OPERATING PARAMETERS.

PROGRAM NUMBERS

The DSP-128 comes from the factory programmed with 128 effects denoted by program numbers "P 1" to "P128".

The PROGRAM NUMBER selects a particular memory location. Any one or all of these memory locations may be reprogrammed by the user. Any available effect along with its specific parameter value settings may be programmed into any of the 128 memory locations. The PROGRAM NUMBER is also the MIDI PROGRAM NUMBER allowing remote MIDI control of the DSP 128.

The PROGRAM NUMBER shown in the display is changed by using the up and down buttons on the front panel. The PROGRAM NUMBER is also changed by transmitting a MIDI program change command to the unit.

For more information on MIDI control

see the section entitled, MIDI CONTROL OF THE DSP-128.

The factory presets and their operating parameter values are shown in Appendix B of this manual.

EFFECT ALGORITHMS

Pushing the SELECT button once from the PROGRAM NUMBER, will move the EFFECT ALGORITHM residing at that PROGRAM NUMBER into the display. The UP and DOWN buttons on the front panel then change the current EFFECT ALGORITHM number.

The EFFECT ALGORITHM defines the signal processing effect or combination of effects that the DSP 128 is using, i.e. reverb, delay, chorus, flanging, etc.

The DSP-128 contains a library of 17 different effect algorithms, "A 1" to "A 17", and one "off" or "mute" algorithm, "A 0". The 3 X 4 LED matrix on the front panel of the unit shows the effects defined by each algorithm . As the EFFECT ALGORITHM NUMBER is changed, the LED matrix reflects the effect or combination of effects defined by the new algorithm selected.

The algorithms and their operating parameter ranges are shown in Appendix A of this manual.

EFFECT ALGORITHM PARAMETERS

Pushing the select button will move the specific EFFECT ALGORITHM PARAMETERS of the chosen algorithm into the display. Each algorithm has its own unique set of parameters that are used to customize and shape its sound for the users specific needs. The number of EFFECT ALGORITHM PARAMETERS over which the user has control vary from two parameters for a simple algorithm, up to eleven different parameters for the more complicated algorithms.

The key in learning to customize an algorithm to your specific tastes is to experiment with the algorithm's parameters. Any changes made to the FACTORY PRESETS are restored to their original values with the use of the delete function.

A one or two letter abbreviation indicates each ALGORITHM OPERATING PARAMETER. The abbreviations are almost always a simple contraction of the parameters name, i.e. Pd stands for Pre-delay, F stands for Feedback, CL stands for Chorus Level, etc. These prefixes are shown both below and are printed on the top of the DSP 128.

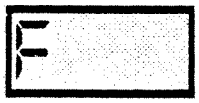
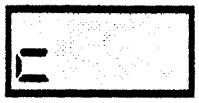
Once the desired ALGORITHM OPERATING PARAMETER is moved into the display using the SELECT button, its value is changed by using the UP and DOWN buttons. The ALGORITHM OPERATING PARAMETER values can also be changed with a properly linked MIDI CONTINUOUS CONTROLLER.

For more information on MIDI control see the section entitled, MIDI CONTROL OF THE DSP 128 in this manual.

Details on the parameter values and ranges are shown in Appendix A of this manual.

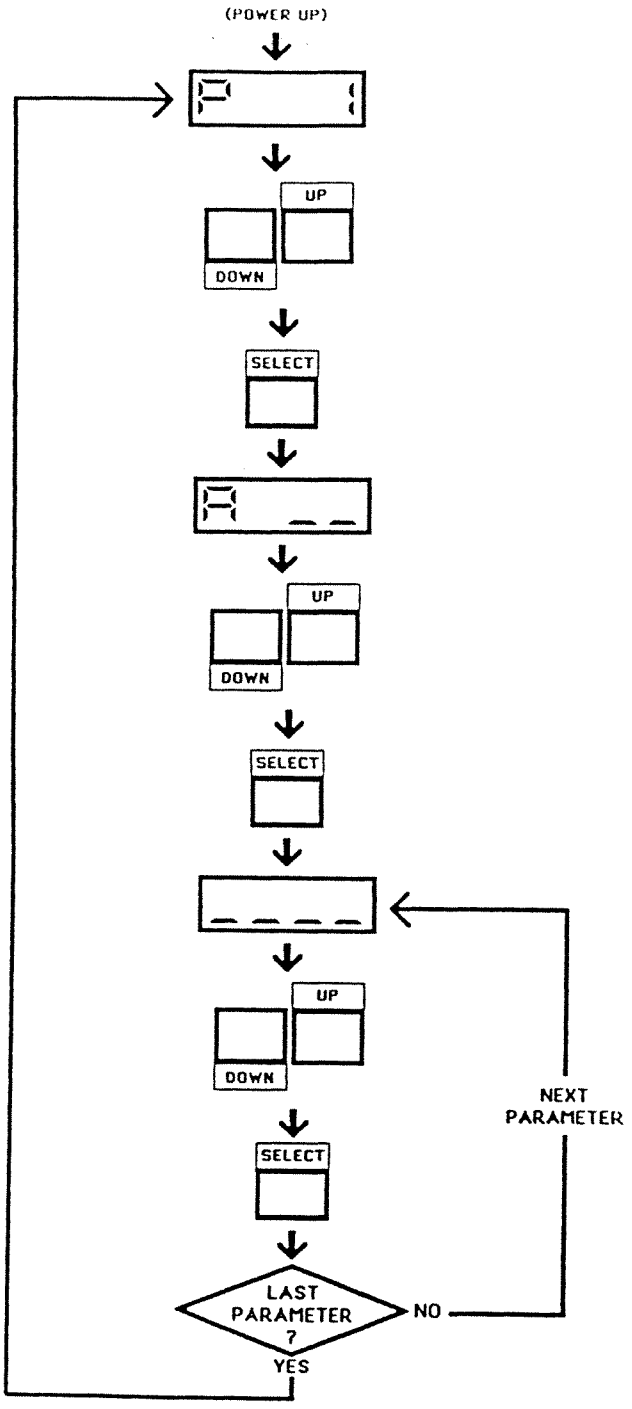
OPERATING PARAMETER ABBREVIATIONS AND DESCRIPTIONS

PREFIX	PARAMETER	EFFECT AND DESCRIPTION
	Reverb Decay Time 1.0 - 20	(reverberation effects) The amount of time for the reverb effect to decay or reduce to inaudibility.
	Reverb Pre-Delay Time 0 - 90 msec	(reverberation effects) The length of time between the original sound and the first delayed reflected sound beginning the reverb effect.
	Accent Envelope -5 - 15	(reverse reverb effects) The placement in time of the end accent of a reverse reverb effect. This parameter places the accent before, at, or after the end of the reverse reverb decay.

PREFIX	PARAMETER	EFFECT AND DESCRIPTION
	Accent Amplitude 0-10	(reverse reverb effects) The strength of the delayed accent placed at the end of the reverse reverb effect.
	Delay Time, or Multi-Tap: Right Delay (see range)	(delay effects, multi-tap delay effect) The amount of delay time in a delayed effect. Also the right side delay time in the MULTI-TAP DELAY effect.
	Delay Range 1-4	(delay effects) The available delay time in the DSP 128 is divided into five ranges: 1. 0 - 249 milliseconds 2. 250 - 449 milliseconds 3. 500 - 749 milliseconds 4. 750 - 999 milliseconds 5. 1.0 - 1.8 seconds
	Delay Level 0-10	(delay effects) The relative strength of the delay effect.
	Feedback 0-99	(delay) The amount of the signal that is internally fedback in the delay.
	Delay Time, Multi-tap Left Delay .000 - 1.8	(multi-tap delay effect) The left side delay time in the MULTI-TAP DELAY effect.
	Delay Time, Multi-Tap Center Delay .000 - 1.8	(multi-tap delay effect) The center delay time in the MULTI-TAP DELAY effect.
	Multi-tap Feedback Delay .000 - 1.8	(multi-tap delay effect) The delay time of the tap that is fedback in the multi-tap delay.
	Low-Pass Filter Cut- Off Frequency .40 - 12	(filtering) The high frequency roll-off point for the low pass filter.
	Animation Velocity 0-99	(chorus effects, flange effects) The velocity at which the delay tap is swept. In effect, adjusting the amount of pitch shifting in the chorus or flange effect.

PREFIX	PARAMETER	EFFECT AND DESCRIPTION
	Animation Distance 0-99	(chorus effects, flange effects) The distance through which the delay tap is swept. In effect, adjusting the depth of the chorus or flange effect.
	Chorus Delay 0-60	(chorus effects) The initial amount of time delay in the chorus effect.
	Chorus Level 0-10	(chorus effects) The relative internal level of the chorus effect.
	Flange Delay Time 0-10	(flange effects) The initial amount of time delay in the flange effect.
	Flange Feedback 0-99	(flange effects) The amount of the signal that is internally fedback in the flange delay.
	Flange Level 0-10	(flange effects) The relative internal level of the flange effect.
	Initial Reflections 0-18 1-6 m Hall	(reverb effects) The relative strength of the first echoes in a reverb effect. This parameter gives a subjective positioning of the listener, front to back, in the reverberant field. The softer the initial reflections are, the further back in the reverberant field the listener seems to be.
	Bounce Texture 0-4	(bounce effect) An apparent hardness or softness to the rebound "bounce" of the sound.
	Stereo Image 1-6	(stereo image generation) A sub-jective width of the stereo image.
	MIDI Channel Number	(MIDI mode) One of sixteen channels available for the reception and transmission of MIDI data. In OMNI mode the DSP 128 recieves data on all sixteen channels and in OFF mode the DSP 128 doesn't recognize any MIDI transmissions.

DSP 128 PROGRAMMING FLOW CHART



The display shows the PROGRAM NUMBER or MIDI PROGRAM NUMBER.

The UP and DOWN buttons move the desired PROGRAM NUMBER into the display.

Push the SELECT button to move the current ALGORITHM NUMBER into the display.

The display shows the current ALGORITHM NUMBER defining the program effect.

Use the UP and DOWN buttons to select ALGORITHM NUMBER for the desired effect or effects, also shown in the 3 x 4 LED matrix.

Use the SELECT button to move the first ALGORITHM PARAMETER into the display.

The display shows the ALGORITHM PARAMETER prefix and its current value.

Use the UP and DOWN buttons to select the desired value for the ALGORITHM PARAMETER.

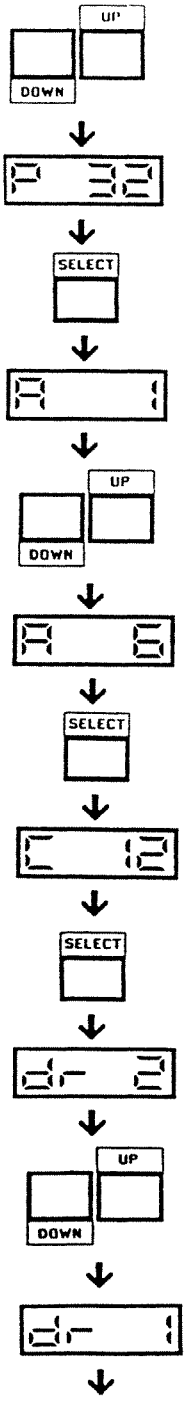
Push the SELECT button to move to the next ALGORITHM PARAMETER. next Or, if the last PARAMETER has been parameter selected, the DSP 128 loops back to the current PROGRAM NUMBER.

Note: While programming the DSP 128 pushing the UP and DOWN buttons at the same time, resets the display to the PROGRAM NUMBER.

PROGRAMMING EXAMPLE FOR THE DSP 128

Follow this example to see how an effect is programmed into the DSP 128:

Suppose that you wish to put a short delay of 135 milliseconds with a 40% feedback with no filtering at program memory location #32.



Use the UP and DOWN buttons to bring up PROGRAM # 32.

The LED display shows "P 32" for PROGRAM number 32.

Press the SELECT button to bring up the ALGORITHM level. This display the algorithm number that is currently residing at that memory location. The factory preset at that location is "A 1".

Use the UP and DOWN buttons to select ALGORITHM # 6.

The LED display shows "A 6".

Press the SELECT button to bring up the first OPERATING PARAMETER.

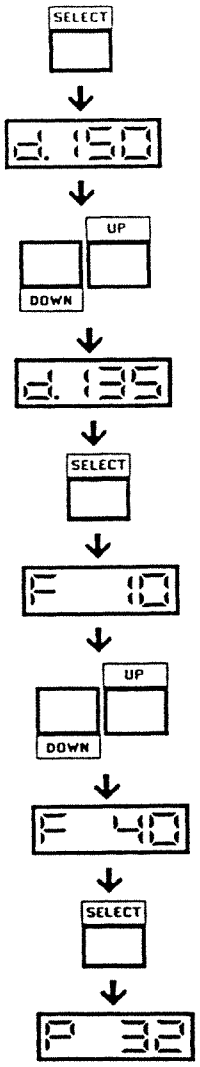
For ALGORITHM #6, the first parameter is the LOW PASS FILTER indicated by the "C 12" on the LED display. The "C" (cut off point) is "12" for 12 kHz. We want full bandwidth so leave this value alone.

Press the SELECT button to bring up the next operating parameter.

"dr 2" for DELAY RANGE number 2 is shown on the LED display.

Use the DOWN button to decrement down to DELAY RANGE number 1. This is the DELAY RANGE for values from 0 to 250 milliseconds.

The LED display shows "dr 1" for DELAY RANGE number 1.



Press the SELECT button to bring up the next OPERATING PARAMETER.

"d.150" for a DELAY of 150 milliseconds is shown on the LED display.

Use the DOWN button to decrement to the desired delay value of 135 milliseconds. Should you pass this value, use the UP button to increment to the 135 millisecond value.

Use the SELECT button to bring up the next OPERATING PARAMETER.

The LED display shows "F 10" for a FEEDBACK value of 10%.

Use the UP button to increment to a FEEDBACK value of 40%. Should you pass this value, use the DOWN button to decrement to the 40% FEEDBACK value.

The LED display shows "F 40" for a FEEDBACK value of 40%.

Since the FEEDBACK is the last parameter, pressing the SELECT button once more brings up the PROGRAM NUMBER.

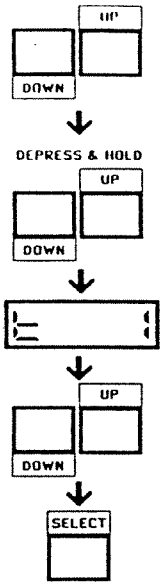
The LED display shows "P 32" for PROGRAM NUMBER 32.

Should you pass a value that you wanted to change, you have two choices. You can continue to press the SELECT button until you rotate back to the value you passed. Or, you may momentarily press the UP and DOWN buttons at the same time resetting back to the PROGRAM NUMBER. You may then advance to the value that you passed with the SELECT button.

You have now "edited" the program at memory location 32. Your programmed effect will stay in that location even when the power to the DSP 128 is turned off.

PROGRAM COPY FUNCTION

The DSP 128 allows a simple way to transfer the contents of one program location to another. The procedure uses the prefix "t" (for TARGET PROGRAM NUMBER) to denote the PROGRAM NUMBER that is to be copied over. This procedure is shown in the flow chart below.



Use the UP and DOWN buttons to select the program that you wish to copy to a new program location.

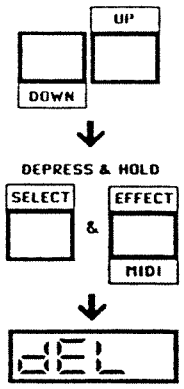
Press and hold both the UP and DOWN buttons until "t 1", the TARGET PROGRAM NUMBER appears in the display.

Use the UP and DOWN buttons to select the desired TARGET PROGRAM NUMBER.

Press SELECT to complete the transfer leaving a duplicate of the selected program in the new memory location.

SINGLE FACTORY PRESET RESTORE FUNCTION

The DSP 128 allows a simple way to delete the contents of any program and replace it with the FACTORY PRESET for that location. This procedure is shown in the flow chart below.



Use the UP and DOWN Buttons to select the program you wish to delete.

Press and hold both the EFFECT and SELECT buttons until "dEL " appears in the display.

The contents of that location have now been replaced with the FACTORY PRESET for that location.

GLOBAL FACTORY PRESET RESTORE FUNCTION

The DSP 128 allows the entire machines contents to be erased and replaced with factory default values. This includes all programs, and midi parameters and can not be undone. The procedure is as follows: Turn the power switch on the unit to the OFF position. Turn the power switch on the unit to the on position while pressing both the EFFECT and SELECT buttons. The letters "F Pr", for FACTORY PRESET, will show momentarily in the display and the DSP-128 will have all 128 programs returned to their original FACTORY PRESET values. Also all MIDI continuous controllers will be disabled, and the unit will be set to MIDI CHANNEL 1.
CAUTION: *All user preset data will be lost.*

DISPLAY MODE FUNCTION

A special display mode has been programmed into the DSP 128 to tell the user about the capabilities of the unit. This mode has no performance function. To put the DSP 128 into the display mode: depress both the DOWN and EFFECT buttons at the same time as you POWER UP the unit. To release the unit from this mode depress any of the function buttons. The unit will stay latched in the display mode until one of the function buttons are depressed, even if the power is turned off and on again.

SELF TEST MODE

A self-test sequence is programmed into the memory of the DSP 128. To initiate the self-test, push the UP and the SELECT buttons at the same time when powering up. All of the LED's will light, and the LED display with show " 8.8.8.8 ". Pushing any of the function buttons initiates the self-check sequence. If the unit tests alright, the sequence ends with " SeLF tESt PASSEd ". The unit then displays " P 1 " and is ready to work.

SOFTWARE REVISION NUMBER

Pushing the DOWN and SELECT buttons at the same time when powering up causes the LED display to show the current software revision in the DSP 128. Pushing any other function button causes the unit to display " P 1 " and puts the unit in operate mode.

MIDI CONTROL OF THE DSP 128

INTRODUCTION TO MIDI

MIDI (Musical Instrument Digital Interface) is the communication specification defined by the world's musical instrument manufacturers to allow electronic devices to communicate. The specification was initially intended to allow keyboards to communicate with other keyboards and computers, and thus, the specification includes codes to represent note on, note off, volume dynamics, pitch bend, patch change, etc. In fact, an examination of the controls of a synthesizer gives a good indication of the types of commands that the MIDI specification covers.

While a portion of the MIDI specification deals exclusively with music generation, i.e. note on, note off, pitch bend, and like commands, the rest of the MIDI specification provides a means to control the function of electronic hardware. The MIDI program and control change commands offer a wide range of possibilities for controlling signal processing effects.

THE DSP 128'S USE OF MIDI CONTROL

The DSP-128 makes use of MIDI technology for the remote or programmed control of the effects it generates. MIDI PROGRAM CHANGE NUMBERS and MIDI CONTINUOUS CONTROLLERS are used to manipulate the effects in the unit.

The Digitech PDS-3500 MIDI PEDAL can be used to send MIDI PROGRAM CHANGE NUMBERS, and the combination of the Digitech PDS-3500 and the DOD FX-17 Volume/-Controller Pedal can be used to send MIDI CONTINUOUS CONTROL information.

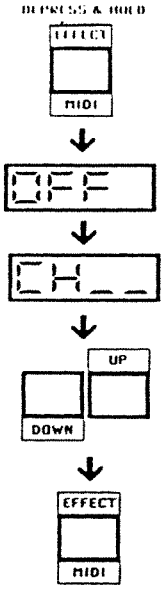
The DSP-128 has standard MIDI IN, THRU, and OUT jacks on the rear panel. The MIDI IN jack receives MIDI data sent from any MIDI controlling device. The MIDI out jack transmits system exclusive data. The MIDI THROUGH jack transmits a copy of the MIDI input data to allow "daisy chaining" of MIDI compatible units so that they may receive the MIDI controlling data over one line.

Be certain that the DSP 128 is "down stream" from the controller, and that the MIDI cables are properly connected.

MIDI CHANNEL NUMBERS

MIDI data may be transmitted on any of sixteen channels. The DSP-128 receives information from any one of the MIDI channels or all of the sixteen MIDI channels at once (OMNI RECEPTION MODE), or not receive any MIDI data at all, (MIDI OFF). The procedure for changing the MIDI CHANNEL is shown in the following flowchart.

CHANGING THE MIDI CHANNEL



Press and hold the MIDI button. The unit will display "OFF " followed by "CHxx", the current CHANNEL NUMBER. The unit is now in MIDI PROGRAM MODE.

Use the UP and DOWN buttons to change the MIDI CHANNEL NUMBER to CH1" - "CH16", "o"(OMNI MODE), or "n"(OFF).

Press the MIDI button to return the DSP-128 to OPERATING MODE.

MIDI PROGRAM CHANGES

Programs in the DSP 128 are changed by MIDI PROGRAM CHANGE NUMBERS transmitted from another MIDI controlling unit. MIDI PROGRAM CHANGE NUMBERS directly correspond to the PROGRAM NUMBERS of the DSP-128. When a MIDI PROGRAM CHANGE NUMBER is received by the DSP-128, on the proper CHANNEL, it responds by changing to the corresponding PROGRAM NUMBER. For example, if the unit receives MIDI PROGRAM CHANGE NUMBER "24" it will change to "P 24" and recall the preset that has been programmed there, whether the effect is a factory preset or has been programmed by the user.

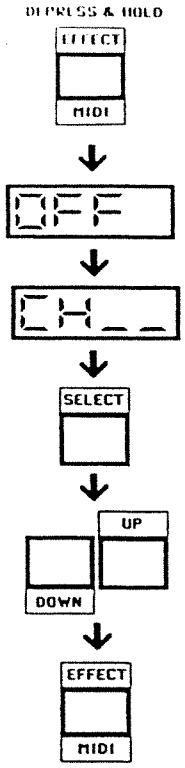
MIDI CONTINUOUS CONTROLLERS

MIDI CONTINUOUS CONTROLLERS may be assigned to control any of the EFFECT ALGORITHM PARAMETERS.

A MIDI CONTINUOUS CONTROLLER linked is to a EFFECT ALGORITHM PARAMETER by assigning a controller number to the desired parameter. This is a global link and thus the assigned controller will have control of that particular parameter in all the algorithms that it appears. For example: the prefix "Pd" (denoting pre-delay), can be linked to CONTINUOUS CONTROLLERS 1 through 99, or channel pressure (CP). Once that link is made, the linked MIDI CONTINUOUS CONTROLLER will control the pre-delay parameter in any current EFFECT ALGORITHM that contains pre-delay.

The procedure for assigning MIDI CONTINUOUS CONTROLLERS is shown in the following flowchart.

ASSIGNING MIDI CONTINUOUS CONTROLLERS TO EFFECT ALGORITHM PARAMETERS



Press and hold MIDI button. The unit will display "OFF " followed by "CHxx", the current CHANNEL NUMBER. The unit is now in MIDI PROGRAM MODE.

Assigned MIDI CHANNEL NUMBER.

Push the SELECT button until the desired ALGORITHM PARAMETER moves into the display.

Use the UP and DOWN buttons to change the CONTINUOUS CONTROLLER number to 1-99, "CH" (Channel Pressure), or "n"(no link).

Press the MIDI button to return the DSP-128 to OPERATING MODE.

NOTE: When the DSP 128 encounters an OPERATING PARAMETER which is assigned to a MIDI CONTINUOUS CONTROLLER, the CONTINUOUS CONTROLLER determines the value for that parameter, not the programmed preset value.

DATA STORAGE ON THE DSP-128

The preset values of all 128 programs, the MIDI CHANNEL and MIDI CONTINUOUS CONTROLLER assignments may be saved to a MIDI recorder or used to transfer programs from one DSP-128 to another. A MIDI system exclusive data dump transfers this data to a MIDI recording device.

To save the user preset data in the DSP 128 to a recording device, connect the MIDI OUT jack of the DSP-128 to the MIDI IN jack of the recorder. Set the MIDI recorder up to receive the data.

If you wish to program one DSP-128 for another DSP-128 connect the MIDI OUT jack of the sending unit to the MIDI IN jack of the receiving one.

The procedure for initiating a MIDI system exclusive data dump from the DSP 128 is as follows: Set the DSP 128 to "P127" and assign algorithm "A 0" to that program number. If another DSP-128 is receiving the data set it to "P127" with "A 0" also. Press the EFFECT and UP buttons simultaneously. "out " shows on the display as the data is sent to the MIDI OUT jack. The unit's display returns to "P127" when the transfer is complete. If the receiving unit is another DSP-128 the display shows "in " as it receives the data.

The DSP-128 also responds to a MIDI request for data dump command on the MIDI IN jack.

To procedure for receiving a MIDI system exclusive data dump is as follows: Connect the MIDI OUT of the recorder to the MIDI IN of the DSP-128. Set the DSP-128 to "P127" and assign "A 0" to that program. Initiate the recorder to dump the system exclusive data. The display of the DSP-128 shows "In " as it receives the data. The unit returns to "P127" when the transfer is complete.

* Notes *

DSP 128 SPECIFICATIONS

ELECTRONIC SPECIFICATIONS:

Inputs:	Right & Left 1/4-inch tip-ring sleeve phone jacks, balanced or unbalanced
Input Level Select:	+4 / -20 dB nominal level
Maximum Input Level:	+18 dBv (ref.: 0.775 V_{rms})
Dry Outputs:	Right & Left 1/4-inch tip-ring sleeve phone jacks, balanced or unbalanced
Mix Outputs:	Right & Left 1/4-inch tip-ring-sleeve phone jacks, balanced or unbalanced
Output Level Select:	+4 / -20 dB nominal level
Maximum Output:	+18 dBv (ref.: 0.775 V_{rms})
THD:	Less than 0.08% at 1 kHz
MIDI Jacks:	MIDI IN, MIDI THROUGH, & MIDI OUT
Resolution:	16 bit, linear PCM conversion
Signal to Noise Ratio:	Typically 88 dB Minimum is greater than 85 dB
Frequency Response-Dry: *Wet:*	20 Hz to 20 kHz, +/-0.5 dB 20 Hz to 12 kHz, +0,-3 dB
Number of Presets:	128
Dimensions:	1.75" H. x 19" W. x 8.5" D (44mm H. x 483mm W. x 216mm D.)
Weight:	5.5 lbs. (2.5 kg)

MAIN ALGORITHMS

Appendix A:

A#	Description	Parameters	Range
0	Mute	None	Not Applicable
1	Small Room, Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Initial Reflection Level	0 - 10
		Decay Time	100 - 1000 msec.
		Reverb Level	0 - 10
		Delay Range	1 - 4
		Delay Time	0 - 999 msec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
2	Medium Room, Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Initial Reflection Level	0 - 10
		Decay Time	100 - 1000 msec.
		Reverb Level	0 - 10
		Delay Range	1 - 4
		Delay Time	0 - 999 msec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
3	Large Room, Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Initial Reflection Level	0 - 10
		Decay Time	100 - 1000 msec.
		Reverb Level	0 - 10
		Delay Range	1 - 4
		Delay Time	0 - 999 msec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
4	Gated Reverb, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Decay Time	50 - 600 msec.
5	Reverse Reverb, Filter	Low Pass Filter	400 Hz - 12 kHz
		Decay Time	100 - 600 msec.
		Accent Amplitude	0 - 10
		Accent Envelope	-50 - +50 msec.
6	Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Delay Range	1 - 5
		Delay Time	0 - 1.8 sec.
		Delay Feedback	0 - 99%
7	Multi-tap Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Left Delay Time	0 - 1.8 sec.
		Middle Delay Time	0 - 1.8 sec.
		Right Delay Time	0 - 1.8 sec.
		Feedback Delay Time	0 - 1.8 sec.
		Delay Feedback	0 - 99%
8	Chorus, Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Animation Velocity	0 - 99
		Animation Distance	0 - 99
		Chorus Delay Time	0 - 60 msec.
		Chorus Level	0 - 10
		Delay Range	1 - 5
		Delay Time	0 - 1.8 sec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10

MAIN ALGORITHMS (continued)

A#	Description	Parameters	Range
9	Flange, Delay, Filter	Low Pass Filter	400 Hz - 12 kHz
		Animation Velocity	0 - 99
		Animation Distance	0 - 99
		Chorus Delay Time	0 - 60 msec.
		Chorus Level	0 - 10
		Delay Range	1 - 5
		Delay Time	0 - 1.8 sec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
10	Hall Reverberation, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Initial Reflection Level	1 - 6
		Decay Time	0.1 - 30 sec.
11	Live Medium Room, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Decay Time	0.4 - 4.0 sec.
12	Live Large Room, Filter	Low Pass Filter	400 Hz - 12 kHz
		Pre-Delay	0 - 90 msec.
		Decay Time	1.0 - 20 sec.
13	Multi-Tap Delay, Reverse Reverb, Filter	Low Pass Filter	400 Hz - 12 kHz
		Left Delay Time	0 - 1.8 sec.
		Middle Delay Time	0 - 1.8 sec.
		Right Delay Time	0 - 1.8 sec.
		Feedback Delay Time	0 - 1.8 sec.
		Delay Feedback	0 - 99%
		Decay Time	100 - 600 msec.
14	Medium Room, Delay, Chorus	Pre-Delay	0 - 90 msec.
		Decay Time	0.3 - 2.8 sec.
		Reverb Level	0 - 10
		Delay Range	1 - 4
		Delay Tiem	0 - 999 msec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
		Animation Velocity	0 - 99
		Animation diatance	0 - 99
		Chorus Delay Time	0 - 60 msec.
		Chorus Level	0 - 10
15	Large Room, Delay, Chorus	Pre-Delay	0 - 90 msec.
		Decay Time	1.0 - 20 sec.
		Reverb Level	0 - 10
		Delay Range	1 - 4
		Delay Tiem	0 - 999 msec.
		Delay Feedback	0 - 99%
		Delay Level	0 - 10
		Animation Velocity	0 - 99
		Animation diatance	0 - 99
		Chorus Delay Time	0 - 60 msec.
		Chorus Level	0 - 10
16	Bounce Effect, Filter	Low Pass Filter	400 Hz - 12 kHz
		Decay Time	0.6 - 2.0 sec.
		Bounce Texture	0 - 4
17	Stereo Image Generator, Filter	Low Pass Filter	400 Hz - 12 kHz
		Stereo Image	1 - 6

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS
P 33	A 1	C 12	Pd 0	Ir10	rd .6	rL 6	dr 2	d.400	F 10	dL 7			Small Room, Delay 3
P 34	A 1	C 12	Pd 0	Ir10	rd .8	rL 2	dr 3	d.500	F 0	dL 6			Small Room, Delay 4
P 35	A 1	C 12	Pd 0	Ir10	rd .6	rL 4	dr 3	d.600	F 0	dL 6			Small Room, Delay 5
P 36	A 1	C 12	Pd 0	Ir10	rd .8	rL 5	dr 4	d.790	F 0	dL 6			Small Room, Delay 6
P 37	A 4	C 12	Pd 0	rd.05									50m Gate
P 38	A 4	C 12	Pd 0	rd.10									100m Gate 1
P 39	A 4	C .85	Pd 0	rd.10									100m Gate 2
P 40	A 4	C 12	Pd 0	rd.20									200m Gate 1
P 41	A 4	C 2.6	Pd25	rd.20									200m Gate 2
P 42	A 4	C 2.6	Pd 0	rd.30									300m Gate 1
P 43	A 4	C 12	Pd30	rd.30									300m Gate 2
P 44	A 4	C 12	Pd 0	rd.40									400m Gate
P 45	A 4	C 5.6	Pd25	rd.50									500m Gate
P 46	A 4	C 12	Pd 0	rd.60									600m Gate
P 47	A 5	C 12	rd.10	AA10	AE 2								100m Reverse
P 48	A 5	C 12	rd.15	AA10	AE 2								150m Reverse
P 49	A 5	C 12	rd.20	AA10	AE 2								200m Reverse
P 50	A 5	C 12	rd.30	AA 5	AE 4								300m Reverse
P 51	A 5	C 2.6	rd.40	AA 5	AE 4								400m Reverse
P 52	A 5	C 2.6	rd.50	AA 5	AE 0								500m Reverse
P 53	A 5	C 8.2	rd.60	AA 5	AE 0								600m Reverse
P 54	A 13	C 12	b .25	c .50	d .75	E1.00	F 40	rd.30					Multitap, Reverse 1
P 55	A 13	C 12	b .35	c .80	d .51	E .86	F 30	rd.35					Multitap, Reverse 2
P 56	A 13	C 12	b .90	c .30	d .60	E .90	F 30	rd.45					Multitap, Reverse 3
P 57	A 10	C 12	Pd 0	Ir 2	rd .8								Hall 1
P 58	A 10	C 12	Pd 0	Ir 3	rd1.2								Hall 2
P 59	A 10	C 12	Pd20	Ir 2	rd1.6								Hall 3
P 60	A 10	C 1.8	Pd 0	Ir 6	rd1.6								Hall 4
P 61	A 10	C 12	Pd30	Ir 2	rd2.4								Hall 5
P 62	A 10	C 5.6	Pd 0	Ir 6	rd3.2								Hall 6
P 63	A 10	C 1.8	Pd 0	Ir 3	rd3.2								Hall 7
P 64	A 10	C 12	Pd30	Ir 2	rd4.0								Hall 8

DigiTech DSP 128 PRESETS - OPERATING PARAMETERS - Page 1

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS
P 1	A 3	C 12	Pd40	Ir10	rd4.0	rL 3	dr 1	d.000	F 0	dL 0			Large Room 1
P 2	A 3	C 3.9	Pd20	Ir10	rd3.0	rL 7	dr 1	d.000	F 0	dL 0			Large Room 2
P 3	A 3	C .85	Pd20	Ir10	rd5.0	rL 7	dr 1	d.000	F 0	dL 0			Large Room 3
P 4	A 3	C 1.8	Pd20	Ir 4	rd10	rL 7	dr 1	d.000	F 0	dL 0			Large Room 4
P 5	A 3	C 12	Pd30	Ir10	rd20	rL 7	dr 1	d.000	F 0	dL 0			Large Room 5
P 6	A 3	C 12	Pd 0	Ir 8	rd8.0	rL 3	dr 1	d.170	F 20	dL 4			Large Room, Delay 1
P 7	A 3	C 12	Pd 0	Ir 8	rd10	rL 2	dr 2	d.250	F 30	dL 7			Large Room, Delay 2
P 8	A 3	C 12	Pd 0	Ir10	rd5.0	rL 2	dr 2	d.340	F 0	dL 6			Large Room, Delay 3
P 9	A 3	C 12	PD 0	Ir10	rd8.0	rL 2	dr 4	d.750	F 0	dL 6			Large Room, Delay 4
P 10	A 12	C 12	PD 0	rd1.8									Live Large Room 1
P 11	A 12	C 12	Pd 0	rd2.6									Live Large Room 2
P 12	A 12	C 12	Pd30	rd5.0									Live Large Room 3
P 13	A 12	C 12	Pd 0	rd6.0									Live Large Room 4
P 14	A 2	C 12	Pd 0	Ir10	rd .6	rL10	dr 1	d.000	F 0	dL 0			Medium Room 1
P 15	A 2	C 2.6	Pd30	Ir10	rd1.6	rL10	dr 1	d.000	F 0	dL 0			Medium Room 2
P 16	A 2	C 8.2	Pd 0	Ir 5	rd2.0	rL10	dr 1	d.000	F 0	dL 0			Medium Room 3
P 17	A 2	C 8.2	Pd 0	Ir 8	rd2.2	rL10	dr 1	d.000	F 0	dL 0			Medium Room 4
P 18	A 2	C 12	Pd 0	Ir10	rd2.6	rL10	dr 1	d.000	F 0	dL 0			Medium Room 5
P 19	A 2	C 12	Pd 0	Ir 8	rd2.2	rL 2	dr 1	d.150	F 30	dL 7			Medium Room, Delay 1
P 20	A 2	C 12	Pd20	Ir 5	rd2.6	rL 5	dr 2	d.250	F 30	dL 5			Medium Room, Delay 2
P 21	A 2	C 12	Pd 0	Ir10	rd2.6	rL 2	dr 2	d.300	F 0	dL 9			Medium Room, Delay 3
P 22	A 2	C 12	Pd 0	Ir10	rd2.6	rL 7	dr 4	d.750	F 0	dL 9			Medium Room, Delay 4
P 23	A 11	C 12	Pd 0	rd1.2									Live Medium Room 1
P 24	A 11	C 12	Pd 0	rd1.6									Live Medium Room 2
P 25	A 11	C 12	Pd20	rd2.0									Live Medium Room 3
P 26	A 1	C 2.6	Pd10	Ir 5	rd .4	rL10	dr 1	d.000	F 0	dL 0			Small Room 1
P 27	A 1	C 8.2	Pd20	Ir10	rd .6	rL10	dr 1	d.000	F 0	dL 0			Small Room 2
P 28	A 1	C 12	Pd 0	Ir 5	rd .9	rL10	dr 1	d.000	F 0	dL 0			Small Room 3
P 29	A 1	C 8.2	Pd20	Ir10	rd1.0	rL10	dr 1	d.000	F 0	dL 0			Small Room 4
P 30	A 1	C 1.2	Pd 0	Ir10	rd1.0	rL10	dr 1	d.000	F 0	dL 0			Small Room 5
P 31	A 1	C 12	Pd 0	Ir10	rd .6	rL 6	dr 1	d.090	F 20	dL 6			Small Room, Delay 1
P 32	A 1	C 12	Pd 0	Ir10	rd .9	rL 6	dr 1	d.150	F 0	dL 7			Small Room, Delay 2

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS
P 97	A 8	C .60	Av14	Ad30	Cd35	CL10	dr 5	d1.00	F 0	dL 5			Chorus, Delay 3
P 98	A 8	C 12	Av17	Ad25	Cd40	CL10	dr 5	d1.40	F 0	dL 5			Chorus, Delay 4
P 99	A 14	Pd10	rd .8	rL 3	dr 1	d.249	F 20	dL 3	Av 5	Ad11	Cd40	CL10	Chor, Del, M Room 1
P100	A 14	Pd 0	rd1.0	rL 6	dr 2	d.250	F 0	dL 6	Av10	Ad20	Cd40	CL10	Chor, Del, M Room 2
P101	A 14	Pd30	rd1.2	rL 3	dr 2	d.390	F 30	dL 4	Av14	Ad30	Cd40	CL10	Chor, Del, M Room 3
P102	A 14	Pd25	rd1.4	rL 1	dr 2	d.450	F 30	dL 2	Av 5	Ad20	Cd30	CL 5	Chor, Del, M Room 4
P103	A 14	Pd25	rd2.2	rL 2	dr 3	d.625	F 20	dL 2	Av10	Ad18	Cd50	CL 5	Chor, Del, M Room 5
P104	A 15	Pd35	rd4.0	rL 1	dr 2	d.420	F 30	dL 2	Av 5	Ad13	Cd40	CL 7	Chor, Del, L Room 1
P105	A 15	Pd25	rd5.0	rL 1	dr 4	d.800	F 30	dL 2	Av11	Ad35	Cd40	CL 7	Chor, Del, L Room 2
P106	A 15	Pd35	rd4.0	rL 2	dr 1	d.000	F 0	dL 0	Av11	Ad31	Cd50	CL 8	Chor, Del, L Room 3
P107	A 15	Pd25	rd5.0	rL 4	dr 3	d.550	F 50	dL 5	Av15	Ad20	Cd60	CL10	Chor, Del, L Room 4
P108	A 15	d70	rd20	rL 2	dr 1	d.000	F 0	dL 0	Av14	Ad25	Cd60	CL10	Chor, Del, L Room 5
P109	A 9	C 12	Av 2	Ad 9	Fd 9	FF60	FL10	dr 1	d.000	F 0	dL 0		Flange 1
P110	A 9	C 12	Av 5	Ad 9	Fd 6	FF60	FL10	dr 1	d.000	F 0	dL 0		Flange 2
P111	A 9	C 12	Av15	Ad29	Fd10	FF30	FL10	dr 1	d.000	F 0	dL 0		Flange 3
P112	A 9	C 12	Av11	Ad 4	Fd 3	FF60	FL10	dr 1	d.000	F 0	dL 0		Flange 4
P113	A 9	C 12	Av 3	Ad55	Fd10	FF60	FL 7	dr 1	d.000	F 0	dL 0		Flange 5
P114	A 9	C 2.6	Av 3	Ad16	Fd 0	FF70	FL10	dr 1	d.000	F 0	dL 0		Flange 6
P115	A 9	C 12	Av 2	Ad 9	Fd 9	FF60	FL10	dr 3	d.550	F 30	dL 5		Flange, Delay 1
P116	A 9	C 12	Av 5	Ad 9	Fd 6	FF60	FL10	dr 4	d.999	F 40	dL 6		Flange, Delay 2
P117	A 9	C 12	Av 1	Ad12	Fd 1	FF80	FL10	dr 1	d.150	F 40	dL 7		Flange, Delay 3
P118	A 9	C 12	Av 7	Ad24	Fd10	FF30	FL10	dr 2	d.450	F 30	dL 7		Flange, Delay 4
P119	A 9	C 12	Av15	Ad29	Fd10	FF30	FL10	dr 4	d.750	F 30	dL 2		Flange, Delay 5
P120	A 16	C 12	rd1.0	bt 0									Quick Bounce
P121	A 16	C 2.6	rd1.4	bt 0									Medium Bounce
P122	A 16	C 12	rd1.4	bt 4									Soft Medium Bounce
P123	A 16	C 12	rd2.0	bt 4									Soft Long Bounce
P124	A 17	C 12	Sl 3										Thin Image
P125	A 17	C 12	Sl 5										Medium Image
P126	A 17	C 12	Sl 6										Wide Image
P127	A 0												Mute Patch
P128	A 6	C 12	dr 1	d.000	F 0								Thru Patch

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS
P 65	A 10	C 5.6	Pd 0	Ir 6	rd20								Hall 9
P 66	A 6	C 12	dr 1	d.060	F 0								60m Delay
P 67	A 6	C 12	dr 1	d.090	F 0								90m Delay
P 68	A 6	C 12	dr 1	d.090	F 50								90m Delay 50% Regn
P 69	A 6	C 12	dr 1	d.150	F 50								150m Delay 50% Regn
P 70	A 6	C 12	dr 2	d.250	F 0								250m Delay
P 71	A 6	C 12	dr 2	d.250	F 30								250m Delay 30% Regn
P 72	A 6	C 12	dr 2	d.400	F 10								400m Delay 10% Regn
P 73	A 6	C 12	dr 3	d.600	F 0								600m Delay
P 74	A 6	C 12	dr 5	d1.00	F 0								1.0sec Delay
P 75	A 6	C 12	dr 5	d1.40	F 0								1.4sec Delay
P 76	A 6	C 12	dr 5	d1.80	F 0								1.8sec Delay
P 77	A 7	C 12	b .25	c .50	d .75	E1.00	F 40						Multitap 1
P 78	A 7	C 12	b .25	c .50	d .75	E .75	F 40						Multitap 2
P 79	A 7	C 12	b .90	c .60	d .30	E .90	F 30						Multitap 3
P 80	A 7	C 12	b .60	c .45	d .90	E .90	F 30						Multitap 4
P 81	A 7	C 12	b .35	c .51	d .80	E .86	F 30						Multitap 5
P 82	A 7	C 12	b1.20	c .40	d .80	E .80	F 30						Multitap 6
P 83	A 7	C 12	b .45	c .35	d .25	E .45	F 70						Multitap 7
P 84	A 7	C 12	b .48	c .35	d .53	E .48	F 40						Multitap 8
P 85	A 8	C 12	Av 5	Ad11	Cd40	CL10	dr 1	d.000	F 0	dL 0			Chorus 1
P 86	A 8	C 1.8	Av 3	Ad16	Cd35	CL10	dr 1	d.000	F 0	dL 0			Chorus 2
P 87	A 8	C 12	Av 8	Ad20	Cd50	CL 5	dr 1	d.000	F 0	dL 0			Chorus 3
P 88	A 8	C 12	Av10	Ad20	Cd40	CL10	dr 1	d.000	F 0	dL 0			Chorus 4
P 89	A 8	C .60	Av14	Ad30	Cd35	CL10	dr 1	d.000	F 0	dL 0			Chorus 5
P 90	A 8	C 12	Av17	Ad25	Cd40	CL10	dr 1	d.000	F 0	dL 0			Chorus 6
P 91	A 8	C .60	Av11	Ad25	Cd60	CL10	dr 1	d.000	F 0	dL 0			Chorus 7
P 92	A 8	C 12	Av11	Ad25	Cd60	CL10	dr 1	d.000	F 0	dL 0			Chorus 8
P 93	A 8	C 12	Av20	Ad 7	Cd20	CL10	dr 1	d.000	F 0	dL 0			Vibrato 1
P 94	A 8	C 12	Av28	Ad11	Cd50	CL10	dr 2	d.450	F 30	dL 4			Vibrato, Delay 1
P 95	A 8	C 12	Av 3	Ad16	Cd50	CL10	dr 2	d.400	F 50	dL 6			Chorus, Delay 1
P 96	A 8	C 12	Av10	Ad20	Cd40	CL10	dr 4	d.830	F 30	dL 5			Chorus, Delay 2

USER'S PRESET RECORD FORMS

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS

NAME: ______________________ DATE: ______________

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS

NAME: DATE:

PROGRAM	ALGORITHM	PAR 1	PAR 2	PAR 3	PAR 4	PAR 5	PAR 6	PAR 7	PAR 8	PAR 9	PAR10	PAR11	COMMENTS

Appendix C:

MODEL: DSP 128 MIDI IMPLEMENTATION CHART Date: 5 JAN 19

DigiTech Digital Signal Processor Version: 1.09

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
BASIC DEFAULT CHANNEL CHANGED	1-16 1-16	1-16 1-16	MEMORIZED
DEFAULT MODE MESSAGES ALTERED	MODE 3 X	MODE 3 X	OMNI OFF
NOTE TRUE VOICE NUMBER	X	X	
VELOCITY NOTE ON NOTE OFF	X X	X X	
AFTER KEY'S TOUCH CH'S	X X	X O	
PITCH BENDER	X	X	
CONTROL CHANGE	X	1-99	
PROGRAM CHANGE TRUE #	X	0-127	
SYSTEM EXCLUSIVE	O	O	NOTE #1
SYSTEM :SONG POS :SONG SEL COMMON :TUNE	X X X	X X X	
SYSTEM :CLOCK REAL TIME:COMMANDS	X X	X X	
AUX :LOCAL ON/OFF MES-:ALL NOTES OFF AGES :ACTIVE SENSE :RESET	X X X X	X X X X	
NOTES			#1: USED FOR DUMP-ING USER PROGRAMS TO AND FROM THE UNIT.

MODE 1 : OMNI ON, POLY MODE 2 : OMNI ON, MONO O: YE

MODE 3 : OMNI OFF, POLY MODE 4 : OMNI OFF, MONO X: NO

Appendix D:

DEFINED CONTINUOUS CONTROLLER NUMBERS

CONTROL NUMBER	CONTROL 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
12-15	Undefined
16-19	General purpose controllers (#'s 1-4)
20-31	Undefined
32-63	LSB for values 0-31
64	Damper pedal (sustain)
65	Portamento
66	Sostenuto
67	Soft pedal
68	Undefined
69	Hold 2
70-70	Undefined
80-83	General purpose controllers (#'s 5-8)
84-91	Undefined
92	Tremolo Depth
93	Chorus Depth
94	Celeste (Detune) 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
102-121	Undefined
122-127	Channel Mode Messages

Appendix E:

DOD/DigiTech ELECTRONICS SYSTEM EXCLUSIVE FORMAT

INTRODUCTION

The DOD/DigiTech Electronics System Exclusive Format facilitates the use of and provide control over various types of signal processing devices manufactured by DOD/DigiTech Electronics. The Format allows for different types of data transfer, with the provision for expendability in the future. Initially, the Format allows for the transfer of machine-dependent microcode to a DOD/DigiTech digital signal processor. It also allows for dumping the user programmed parameters of a DOD/DigiTech digital signal processor to and from an external device.

DOD/DigiTech ELECTRONICS SYSTEM EXCLUSIVE PROCEDURES

DSP 128 SYSTEM EXCLUSIVE CODES

Device Type : 01H

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	:
0000 0000	:DOD/DigiTech manufacturer's ID number (00H 00H 10H)
0001 0000	:
0000 nnnn	:unit number; nnnn + 1 equals the channel number
0ttt tttt	:device type
0ppp pppp	:procedure type
0ddd dddd	:
0ddd dddd	:
0ddd dddd	:
.	:
.	:
.	:data as needed by procedures
.	:
.	:
.	:
0ddd dddd	:
0ddd dddd	:
1111 0111	:End-of-Exclusive status byte

DEFINITIONS

UNIT NUMBER: This is a number that is the internal representation of the channel that the receiving device is listening to. It is used to communicate to different devices of the same type connected to a common MIDI line. If the receiving device is set to omni then this byte is ignored.

DEVICE TYPE: This is a number which specifies the particular DOD/DigiTech Electronics product that is being communicated with.

PROCEDURE TYPE: This is a number which specifies the procedure within a device type that is to executed. There are 128 possible procedures. Of these, the first 64 (00H to 3FH) are universal procedures that apply to all device types, and the second 64 (40H to 7FH) are procedures that are specific to a particular device type.

DATA: The data that is sent depends on the format of the procedure being executed. See the formats for specific procedures for the expected data format.

SPECIFIC FORMATS FOR THE DSP 128

Sending microcode to the DSP 128

1111 0000	:System Exclusive Status byte
0000 0000	:
0000 0000	:DOD/DigiTech manufacturer's ID number (00H 00H 10H)
0001 0000	:
0000 nnnn	:Unit number; nnnn+1 equals the channel number
0000 0001	:Device type for the DSP 128
0100 0000	:Procedure type for sending microcode to a DSP 128
0ddd dddd	:data byte 1 (see note 1)
0ddd dddd	:data byte 2
0ddd dddd	:data byte 3
0ddd dddd	:data byte 4
.	:
.	:
.	:
.	:
.	:
.	:data in groups of four as needed
.	:
.	:
.	:
.	:
.	:
.	:
.	:
.	:
1111 0111	:End of System Exclusive

(Note 1: The microcode is packed into groups of four data bytes. Specific information on the DSP 128 microcode programming is proprietary information of DOD/DigiTech Electronics Corporation.)

Requesting user programming dump (all programs)

```
1111 0000          :System Exclusive Status byte
0000 0000          :
0000 0000          :DOD/DigiTech manufacturer's ID number (00H 00H 10H)
0001 0000          :
0000 nnnn          :Unit number; nnnn+1 equals the channel number
0000 0001          :Device type for the DSP 128
0000 0000          :Procedure type (all programs dump request)
1111 0111          :End of System Exclusive
```

The unit that the request is sent to will respond:

```
1111 0000          :System Exclusive Status byte
0000 0000          :
0000 0000          :DOD/DigiTech manufacturer's ID number (00H 00H 10H)
0001 0000          :
0000 nnnn          :Unit number; nnnn+1 equals the channel number
0000 0001          :Device type for the DSP 128
0100 0001          :Procedure type (download all programs)
0ddd dddd          :data byte 1
0ddd dddd          :data byte 2
0ddd dddd          :data byte 3
0ddd dddd          :data byte 4
    .
    .
    .

0ddd dddd          :data byte 3143
0ddd dddd          :data byte 3144
1111 0111          :End of System Exclusive
```

Downloading dumped user programming (all programs)

```
1111 0000          :System Exclusive Status byte
0000 0000          :
0000 0000          :DOD/DigiTech manufacturer's ID number (00H 00H 10H)
0001 0000          :
0000 nnnn          :Unit number; nnnn+1 equals the channel number
0000 0001          :Device type for the DSP 128
0100 0001          :Procedure type (download all programs)
0ddd dddd          :data byte 1
0ddd dddd          :data byte 2
0ddd dddd          :data byte 3
0ddd dddd          :data byte 4
    .
    .
    .

0ddd dddd          :data byte 3143
0ddd dddd          :data byte 3144
1111 0111          :End of System Exclusive
```