Eventide®
the next step®

DSP7000

Family Operating Manual

(covering the DSP7000™ and DSP7500™)

For software version 3.0

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IMPORTANT SAFETY INFORMATION

- ❑ Before powering up the unit, check that the voltage selector on the back panel is set correctly.
- ❑ Do not remove any covers or panels from the unit when the power is connected.
- ❑ No operator access to the internals of the unit is permitted - servicing must be performed by qualified personnel only.
- ❑ The unit must **not** be operated with a damaged or ungrounded power cord.
- ❑ Suitable ventilation must be provided for the unit at all times. In particular, the rear and side vents must **not** be obstructed.

HOW TO USE THIS MANUAL – READ THIS FIRST

This manual covers the DSP7000 <u>family</u>, which currently includes the DSP7000 and DSP7500, as well as the DSP4000B+. In the text, all of these models will be referred to jointly as DSP7000. Any aspects which do not refer to all members of the family will be made clear in the text. Any references specific to the DSP7000 also apply to the DSP4000B+.

Each model in the family has a different set of Factory Presets – a list of these for the relevant machine will be found in the Manual's binder.

The first and second chapters of this manual are the most important ones. The first is the **Overview and Quickstart** chapter. In it you will find essential information regarding the front panel, the back panel, and the general structure of the DSP7000. After these preliminaries are out of the way, you'll start using the DSP7000 and learning the basic methodologies that you will employ whenever you use the DSP7000.

The **Overview and Quickstart** chapter is not meant to be complete. It's meant to get you up and running fast, circumventing thornier issues in favor of speed. If you would like to know more about a particular topic discussed in this chapter, look to the abundant references contained therein. They'll point you to "chunkier" discussions in the remainder of the manual.

Ideally, we would have you read through the **Overview and Quickstart** guide with the DSP7000 in front of you, following the examples. After you finish the **Quickstart** guide, we'd have you play with the DSP7000 for awhile. Once the initial "new box euphoria" wore off a bit, we'd have you sit down and read the **Operation** chapter. A true appreciation and mastery of the DSP7000 cannot be obtained without reading the manual! We'd have you consult the appendices only when you need specific, technical information. Finally, when you need to find information days, weeks, months, and years down the road, we'd have you use the comprehensive **Table of Contents** and **Index**.

Note: This manual is intended for DSP7000 family units that were manufactured after 1 April 2003 running version 3.0 software. Most, but not all, of it will apply to other units as well.

OVERVIEW AND QUICKSTART

THE BIG PICTURE

The members of the Eventide DSP7000 family are programmable, multipurpose, 24-bit/96kHz digital audio signal processors with UltraShifter™ capability and are the stereo, single-processor companion product range to the Eventide's Orville. That's a lot of adjectives! They are the successors to a long, proud line of digital signal processors that stretches back to a time when most audio manufacturers didn't know digital audio from Morse code.

We've loaded the DSP7000 with features that put it in a class by itself. The variety and depth of its programs are truly amazing, from lush reverbs, to choruses, to flanges, to delays, to pitch shifters, to dynamics, to EQs, to filters, to distortions, to synthesizers, to samplers, to ring modulators, and to everything in-between. Most frequency and time-dependent parameters (e.g. delays, LFO's) synchronize to a system tempo for ease of use. And if that's not enough, the DSP7500 boasts nearly three minutes of sample time *in addition* to the 40 seconds of delay time!

And for the user who is interested in making his or her *own* programs (if the huge number of factory programs aren't enough!), the DSP7000 family continues the "modular programming paradigm" that made the DSP4000 famous. Programs are composed of individual building blocks, or "modules," that allow the user to create original programs. Inspiration and creativity are given no bounds. . .

KNOBS, KEYS, AND JACKS

If this is your first time learning the DSP7000, don't be put off by some of the rather in-depth descriptions that will follow; they exist for your future reference (*once you understand the DSP7000 and need a quick bit of information*). For now, concentrate on what the various knobs and jacks are *called*. Their use will be explained progressively throughout the rest of this manual.
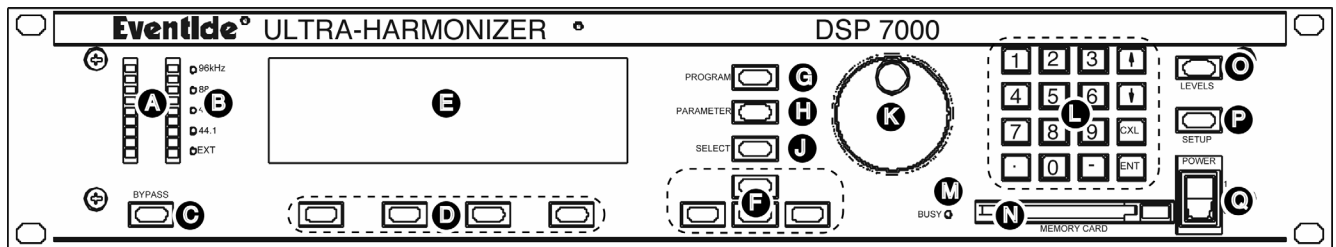
The Front Panel

A) Level Meters

These measure the signals at the analog inputs, the digital inputs, the input and output of the processor, the analog outputs, and the digital outputs. The highest LED indicates a clipped signal, and every LED below that falls off at -3dB per decrement, with the exception of the bottom one, which indicates the presence of any signal.
→ See **The Level Meters** on page 28.

B) System sampling rate and external sync indicator.

The top four LEDs display the system sampling rate of the DSP7000: 96 kHz, 88.2 kHz, 48 kHz, or 44.1 kHz. When solidly lit, they indicate that the system sampling rate is exact (*+/- 0.05%*). When blinking, they indicate that the system sampling rate is between one of the fixed rates (*the LED corresponding to the nearest sampling rate blinks*). The bottom LED, EXT, reflects the current external sync status (*it blinks if there's a problem*).
→ See **Understanding The "System Sampling Rate And External Sync Indicator" When Using The Internal Clock** on page 35.
→ See **Understanding The "System Sampling Rate And External Sync Indicator" When Using The External Clock** on page 37.

C) BYPASS

Press this key to bypass or, depending on how you have your DSP7000 set up, mute the machine.
→ See **Bypassing and Muting** on page 37.

D) SOFT KEYS

These four keys select the menus or events described on the bottom line of the display.
→ See **Understanding the Display and SOFT KEYS** on page 13.

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E) The display	The display tells you what's going on. The top line displays the currently running program and the display area you're working in. The bottom line is dedicated to the four SOFT KEYS directly below the display. The middle section of the display changes depending on what you're doing! → See **Understanding the Display and SOFT KEYS** on page 13.

```
W-I-D-E Solo          pitches
pitch1:    10 cnts  pitch5:     6 cnts
pitch2:   -10 cnts  pitch6:    -6 cnts
pitch3:    -8 cnts  pitch7:    -4 cnts
pitch4:     8 cnts  pitch8:     4 cnts
  pitches    delays    levels     pans
```

F) CURSOR keys

Press these keys to move the cursor on the display.
→ See **Using the Cursor Keys, the SELECT Key, the NUMERIC KEYPAD, and the KNOB** on page 15.

G) PROGRAM

Press this key briefly to access program functions such as loading, saving, deleting, etc.
→ See **Program Load, Save, Delete, Etc.** on page 56.

Press and hold this key for one second to access the Setup Storage area where "setup configurations" are loaded and saved.
→ See **Storing and Loading Setups** on page 66.

H) PARAMETER

Press this key briefly to access parameters for the program that is running.

Press and hold this key for one second to access the Patch Editor.
→ See the separate Programmer's Manual for Patch Editor information.

J) SELECT

Press this key briefly to select something highlighted by the cursor.
Press and hold this key for one second to set up a remote control for whatever parameter is highlighted on the display.
→ See **Remote Controlling Parameters** on page 53.
→ To change the "one second hold time," alter the "key hold" parameter on the [misc] menu page in the SETUP area (you may have to press the SETUP key several times to find it).

K) The KNOB

Spin the KNOB to change the value of whatever parameter is highlighted.
→ See **Using the Cursor Keys, the SELECT Key, the NUMERIC KEYPAD, and the KNOB** on page 15.

L) The NUMERIC KEYPAD

Use the numbers, decimal point, and minus sign to enter numeric values or to enter numeric text in a text field. Use the CXL key to "cancel" the last entered digit (*like a backspace key on a computer*). Use the INC/DEC keys to increment or decrement a parameter's value. Use the ENT key after you've entered a numeric value.
→ See **Using the Cursor Keys, the SELECT Key, the NUMERIC KEYPAD, and the KNOB** on page 15.

M) BUSY LED

If a Memory Card is in place, this LED illuminates when data is being written to the card. Don't remove the Memory Card if this LED is lit! If no Memory Card is in place, this illuminates when data is present at the MIDI In port or at the serial port. Use the latter feature to troubleshoot communication problems between the DSP7000 and the rest of the world.

N) Memory Card slot

Insert a Memory Card here to add new programs or to save your own. Press the release to the right of the slot to remove the card (*but not when the busy LED is lit!*).
→ See **Memory Cards** on page 26.

O) LEVELS

Pressing this key accesses menus for metering and levels.
→ See **Controlling Levels** on page 28.

P) SETUP

Pressing this key accesses menus for digital configuration, MIDI configuration, service utilities, data dump utilities, and program advance options.

Q) POWER

Flip this switch to bring the DSP7000 to life! When the power is off the unit is bypassed, i.e., each audio input is connected to its corresponding audio output.

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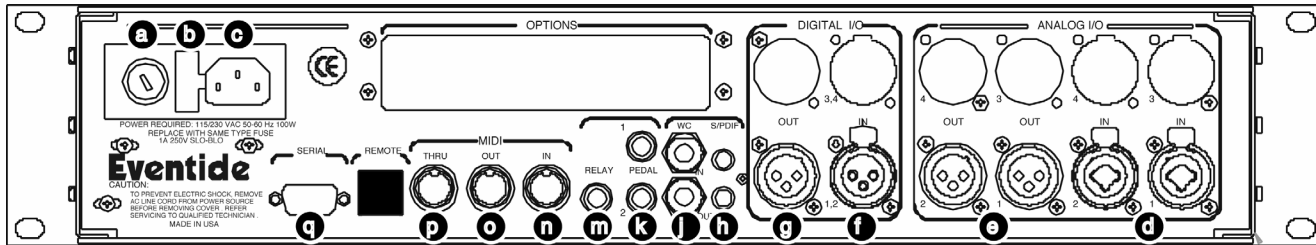
a) AC Voltage Selector

Line up the dot with the triangle so that your preferred voltage is *up*. It is **absolutely essential** that you select the voltage corresponding to your local AC power!

b) Fuse Holder

A 1-Amp Slow Blow fuse. Always replace it with the correct value.

c) AC Port

Connect an IEC standard 3-prong AC power cord here. The center post is chassis ground.

d) Analog Audio Inputs

The DSP7000's analog inputs accept either unbalanced 1/4" connectors or balanced XLR connectors. The DSP7000's XLR input connectors are female. Pin #1 is ground. Pin #2 is +phase (hot) and Pin #3 is -phase.

To "unbalance" the XLR jack, use both pins #1 **and** #3 as ground and use Pin #2 as "hot." **If either pins #2 or #3 are unconnected, you will get more noise and hum than signal !**
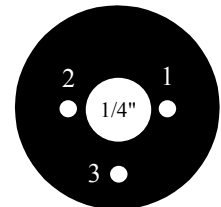
These may be used as both line and guitar inputs, depending on the input level setting.

e) Analog Audio Outputs

The DSP7000's XLR analog audio output jacks are male. Pin #1 is ground. Pin #2 is +phase (hot) and Pin #3 is -phase.

To "unbalance" the jack, use pins #1 **and** #3 as ground and use Pin #2 as "hot." **If either pins #2 or #3 are unconnected, you will get more distortion than signal !**
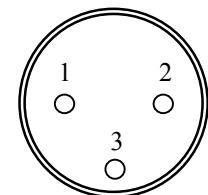
→ See *Controlling the Level of the Analog and Digital Inputs* on page 29.

Do not connect these outputs to a phantom powered microphone input –damage may be caused to either the 7000 or to the phantom power supply. The peak output level from the DSP7000 will probably be too high for a low-level microphone input.

AES/EBU Digital Audio Input/Output (Professional)

Use these connectors to connect professional digital audio gear to the DSP7000. These cables are differen-

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tial with a shielded twisted pair. Eventide recommends the use of purpose-manufactured Digital Audio cables, which have low capacitance and a controlled impedance, for carrying AES signals.

Ordinary microphone cables will usually work at 48kHz, but are likely to reduce range and add jitter and possible distortion to the signal. It is unlikely that microphone cable will prove satisfactory for 96kHz operation.

f) AES/EBU input jack

> If the parameter `DIG IN` on the `clock` menu page in the **SETUP** area is set to `AES/EBU`, then digital inputs are accepted at this jack.

```
GuitarTuner          audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:    AES/EBU      DIG Stat:unlocked
DIG OUT:  AES/EBU      High Speed:disabled
bypass:    relay        Word Clock:disabled
◄   clock  ║  tempo  ║  timer  ║ pedals ►
```

g) AES/EBU output jack

> If the parameter `DIG OUT` on the `clock` menu page in the **SETUP** area is set to `AES/EBU`, then both the AES/EBU and S/P DIF outputs will use the "professional" digital format.

```
GuitarTuner          audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:    AES/EBU      DIG Stat:unlocked
DIG OUT:  AES/EBU      High Speed:disabled
bypass:    relay        Word Clock:disabled
◄   clock  ║  tempo  ║  timer  ║ pedals ►
```

S/P DIF Digital Audio Input/Output (Consumer)

S/P DIF is a consumer digital audio standard, with two audio channels encoded into a single connector. Use these connectors to hook up the DSP7000 to CD players, DAT recorders, and other audio gear using this format. The connectors are two-conductor RCA jacks. Your plug should have the shield connected to the sleeve with the single shielded conductor connected at the tip.

Eventide recommends the use of professional quality cables made of RG-59/U coaxial cable. Ordinary "hi-fi" type leads will probably prove inadequate, especially at the higher sample rates.

h) S/P DIF input/output jacks

> If the parameter `DIG IN` on the `clock` menu page in the **SETUP** area is set to `S/P DIF`, then digital inputs are accepted

```
GuitarTuner          audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:    S/P DIF      DIG Stat:OK
DIG OUT:  S/P DIF      High Speed:disabled
bypass:    relay        Word Clock:disabled
◄   clock  ║  tempo  ║  timer  ║ pedals ►
```

> at the S/P DIF input jack. If the parameter `DIG OUT` on the `clock` menu page in the **SETUP** area is set to `S/P DIF`, then both the AES/EBU and S/P DIF outputs will use the "consumer" digital format.
> → See ***S/P DIF & AES/EBU*** on page 33.

j) WordClock In and Out

> Use these jacks to sync the DSP7000 to wordclock or to output wordclock. → See ***Using an External Clock*** on page 36.

k) Foot Pedal jacks 1 and 2

> Stereo 1/4" connectors. The sleeve is ground reference, the ring is +5 volts (source), and the tip is an analog signal from 0 to 5 volts. Connect either foot switches, foot pedals, or control voltage sources to these inputs to modulate parameters or to trig-

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ger events (including remote program loads).

m) Relay Jack   Two relays are connected to this Stereo 1/4" connector. They can be controlled from suitable programs, allowing the DSP7000 to drive real-world equipment, and can switch up to 1.0A at 30V dc. Relay #1 is connected between ring and sleeve, while Relay # 2 is connected between ring and tip. All of these connections are electrically isolated from the DSP7000. See the separate Programming Manual for information on controlling the relays.

MIDI is used for instrument to instrument digital communications. The DSP7000 sends and receives Eventide system exclusive messages that allow a MIDI sequencer to remote control the DSP7000, among other things. In addition, the DSP7000 may respond to standard MIDI messages and may output standard MIDI messages. The DSP7000 has three MIDI ports:

n) In   The DSP7000 accepts (and processes) MIDI messages received at the MIDI In port.

o) Out   The DSP7000 sends MIDI messages to other devices via the Out port. *MIDI messages are also sent out the serial port if they are "enabled."*

p) Thru   Any MIDI information received at the MIDI In port is echoed directly to the MIDI Thru port regardless of the DSP7000's configuration (*as long as the DSP7000 is powered up*) .

*With the Memory Card removed, the **BUSY** LED on the front panel illuminates whenever a MIDI message is received at the MIDI In port. Note: If the serial port is "enabled" and MIDI is "enabled," a command received over either the serial port or the MIDI In port causes the port* not *receiving the command to be ignored until the command is complete.*

q) Serial Port   An IBM PC type RS232 connector that looks like a modem or printer to a connected computer. Connect a "9 pin" serial cable to this port to transfer information to and from a personal computer (do not use the "null modem" type of cable designed for file transfer between two computers - it will not work). *With the Memory Card removed, the **BUSY** LED on the front panel illuminates whenever a message is received at the serial port. Note: If the serial port is "enabled" and MIDI is "enabled," a command received over either the serial port or the MIDI In port causes the port* not *receiving the command to be ignored until the command is complete.*

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GETTING AROUND AND ALTERING PARAMETERS

Adjusting the Brightness and Contrast of the Display

Before we begin to describe the DSP7000's interface, we ought to make sure you can see the display! Adjust the contrast of the display by repeatedly pressing the SETUP key until you see the `display` soft key. Turn the KNOB to adjust contrast or press the DOWN CURSOR key and turn the KNOB to adjust brightness.

The "Areas" of the DSP7000

The DSP7000's interface is divided into several functional "areas." You access each area by pressing its key. You'll know which area you're in because the LED next to its key will be illuminated. The areas are:

PROGRAM

Press the PROGRAM key to access this area. Inside you'll find utilities for loading programs, saving programs, deleting programs, comparing a tweaked program with the saved version, and creating banks ("manila folders" for organizing programs). Press the PROGRAM key to access additional SOFT KEYS.

→ See **Program Load, Save, Delete, Etc.** on page 56.

SETUP Storage

Press and hold down the PROGRAM key for one second to access this area. The LED next to the PROGRAM key blinks. Inside you'll find utilities for loading, saving, or deleting "setups."

→ See **Storing and Loading Setups** on page 66.
→ To change the "hold time," see **Miscellaneous Setup Options** on page 66.

PARAMETER

Press the PARAMETER key to access this area. Here you'll find the parameters for the currently loaded programs. Continue pressing the PARAMETER key to access additional SOFT KEYS (if available).

→ See *Parameters* on page 63.

```
Backward Garden 3  stereo delay taps
length: 600 ms     levels: lin incr
number taps: 31    delays: lin incr
randomizing: 100 % pans: alternating
width: 100 %       aalpha: 100 %
▶ ▐    taps   ▐▌  reverb  ▐▌ diffusor ▐▌   tone   ▐ ◀
```

The PARAMETER key also gives access to the built-in Patch Editor. Press and hold down the PARAMETER key for one second to access this area. The LED next to the PARAMETER key blinks. The Patch Editor allows you to create your own effects from scratch or to customize programs that already exist.

→ See the separate Programmer's Manual for more information on the Patch Editor.
→ To change the "hold time," see *Miscellaneous Setup Options* on page 66.

```
Patch Editor       feed4
├─rev┐ ┌─mix┤─rev┐ ┌─mix┤─rev┐ ┌─mix┤─rev
              │         │         │
◀▐ ‹ insert › ‹ connect › ‹ modify › ‹ aud only › ▐▶
```
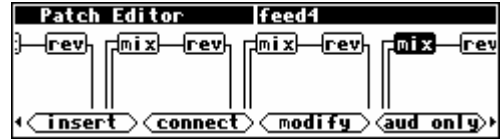
LEVELS

Press the LEVELS key to access this area. Inside you'll find level and Level Meter parameters.

→ See *Controlling Levels* on page 28.

```
Backward Garden 3  Main Levels
OUT 1 Wet/Dry 100% analog  1: 0.0 dB
OUT 2 Wet/Dry 100% analog  2: 0.0 dB
OUT 1 Level 0.0dB  digital 1: 0.0 dB
OUT 2 Level 0.0dB  digital 2: 0.0 dB
    ▐   main   ▐▌  meter  ▐▌ inputs ▐
```

SETUP

Press the SETUP key to access this global, "catch-all" area. Inside you'll find digital setup controls, global MIDI setup, global

```
GuitarTuner        audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:  S/P DIF   DIG Stat:OK
DIG OUT: S/P DIF   High Speed:disabled
bypass:  relay     Word Clock:disabled
◀▐   clock  ▐▌  tempo  ▐▌  timer  ▐▌ pedals ▐▶
```

"external" setup, display contrast/brightness, the pedal jacks' setup, dump data utilities, next/previous program advance, and miscellaneous service utilities. Press the SETUP key more than once to access additional SOFT KEYS.

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Understanding the Display and SOFT KEYS

Every "area" in the DSP7000 makes use of the display, so understanding the display is critical. A generic screen of the sort typically found in the PARAMETER area is shown below. It exemplifies various aspects of the display that remain constant no matter what area of the DSP7000 you're in.
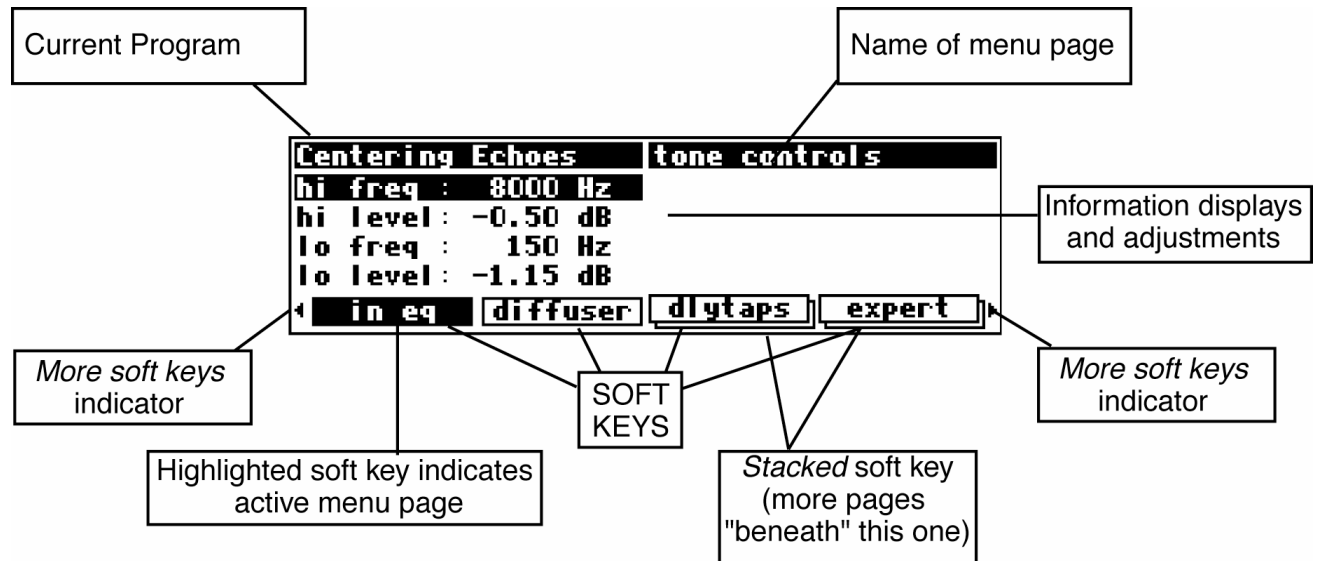
The upper left-hand corner of the display always shows the name of the program currently running. In the example shown above, we're running the program "Centering Echoes." The upper right-hand corner of the display always describes the menu page you're looking at. In the example shown above, we're looking at the "tone controls" menu page.

Situated along the bottom of the display are the so-called "SOFT KEYS." The four physical keys located below the display select menu pages or events corresponding to these SOFT KEYS. (They're called "soft" because their function changes depending on context.) The "More soft keys" indicators are the little arrows next to the SOFT KEYS shown above. They indicate that if you press the "area" key you used to access the current display *again*, you will access *more* SOFT KEYS. The arrows are meant to imply that more pages exist in a nether-world beyond the display. . .

For example, press the SETUP key to see the "More soft keys" indicators.

Press the SETUP key again to get more SOFT KEYS.

Press the SETUP key twice more to return to the original set of SOFT KEYS.

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A "Stacked" SOFT KEY (such as `midi` in the screen above) indicates that if you repeatedly press the "stacked" SOFT KEY, you will access more menus. The graphic is meant to imply that there are more pages lying "below" the "top" one.

For example, press the SETUP key. Press the stacked SOFT KEY `midi`.

```
GuitarTuner      |global configure
MIDI:  enabled   |system exclusive: on
serial: enabled  |device ID:   1
program load: on
sequence out:  off
◄   midi  ||external|| dump  ||nextprog||►
```

Press it again to get a second menu page.

```
GuitarTuner      |MIDI setup
MIDI:  enabled   |pressure: channel
base channel:  1 |pitch bend:   0
omni mode:   on  |sysex speed: 10
note mode: poly
◄   midi  ||external|| dump  ||nextprog||►
```

Press it again to get a third menu page.

Press it twice more to return to the original menu page.

```
GuitarTuner      |serial setup
serial: enabled  |parity: none
baud rate: 57600
data bits: 8
stop bits: 2
◄   midi  ||external|| dump  ||nextprog||►
```

Pressing a SOFT KEY repeatedly that is *not* stacked puts the DSP7000 into "self-destruct" mode. Just kidding. It has no effect.

When you press a SOFT KEY, it becomes highlighted. The middle section of the screen is a menu page corresponding to that highlighted SOFT KEY. Use the cursor keys to "move around" on the menu page. Use the KNOB, the NUMERIC KEYPAD, and the SELECT key to change and enter values.
→ See ***Using the Cursor Keys, the SELECT Key, the NUMERIC KEYPAD, and the KNOB*** on page 15.

Before moving on, we ought to say that not all SOFT KEYS are menu pages. Some SOFT KEYS are "triggers." A "trigger" is a key that *triggers* an event, get it? You'll always know the difference between menu page SOFT KEYS and trigger SOFT KEYS because

```
403 DOORBELL     |params
tone: ►─□─────────────────
tune: ├───────□────────────
‹ ring ›  ■ main ■  ▢ info ▢
```

menu page SOFT KEYS are rectangular, whereas *trigger* SOFT KEYS are hexagonal. On this screen `main` and `info` are menu pages, and `‹ring›` is a trigger.
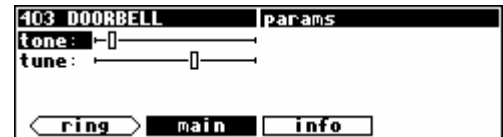
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Using the Cursor Keys, the SELECT Key, the NUMERIC KEYPAD, and the KNOB

We use the CURSOR keys, the KNOB, the SELECT key, and the NUMERIC KEYPAD to navigate and manipulate the menu pages found in the PARAMETER, Patch Editor, LEVELS, and SETUP areas. We'll discuss their use in the PROGRAM and SETUP Storage areas in a bit.

Use of the cursor keys is straightforward. The LEFT and RIGHT CURSOR keys move the cursor left and right, respectively. If you move the cursor "past the edge of the screen," it will "wrap" around to the other side. The UP and DOWN CURSOR keys move the cursor up and down, respectively. Again, the top and bottom "wrap" around.

Use the KNOB, NUMERIC KEYPAD, or the INC/DEC keys to alter the value of a <u>numeric</u> parameter. For example, spin the KNOB on this screen to change the value of Mix or enter a new value directly with the NUMERIC KEYPAD (pressing ENT when you're done).

```
┌─────────────────┬─────────────────┐
│StereoizingPhaser│Phaser Params    │
│Mix  :   50 %    │Shape: Triangle  │
│Rate :  0.40 Hz  │                 │
│Depth:   80 %    │                 │
│Fback:   40 %    │                 │
│   Phase     Info │                │
└─────────────────┴─────────────────┘
```

To get to a screen like this one, first press the *PROGRAM* key. Scroll through the banks (using the *LEFT* or *RIGHT CURSOR* keys and the *KNOB*) to "*PHASERS.*" Scroll through the programs in that bank to "*Stereoizing-Phaser*." Load it and press the *PARAMETER* key.

Use the KNOB or the INC/DEC keys to alter the value of a <u>text</u> parameter. For example, spin the KNOB or press the INC key to change Shape from Sine to Triangle on this screen.

```
┌─────────────────┬─────────────────┐
│StereoizingPhaser│Phaser Params    │
│Mix  :   50 %    │Shape: Sine      │
│Rate :  0.40 Hz  │                 │
│Depth:   80 %    │                 │
│Fback:   40 %    │                 │
│   Phase     Info │                │
└─────────────────┴─────────────────┘
```

Numeric parameters and text parameters cover 99% of the parameters you'll see in the DSP7000, but there are a few more esoteric parameters you'll encounter. One such oddball is the "trigger" parameter. "Triggers" trigger things to happen. You place the cursor over a trigger parameter, and trigger it by pressing SELECT. Other oddballs include "Taps" and "Graphics."

→ See **Taps** on page 63.
→ See **Graphics and Curves** on page 65.

```
┌─────────────────┬─────────────────┐
│Enoesque 1       │pitch parameters │
│shift:  -12 cents│  ■ Hair Trigger │
│delay:100.00 ms  │                 │
│feedback:  20 %  │                 │
│pitch mix:  40 % │                 │
│◀  pitch   reverb │ expert   chorus▶│
└─────────────────┴─────────────────┘
```

Ganged Parameters

In some cases there are multiple, related parameters that are usually adjusted together. To make such "mass adjustments" easy, a feature exists that *gangs* parameters together. The main menu page in the LEVELS area contains a good example of ganged parameters. The purpose of this menu page is to assign signal levels and wet/dry ratios. Such assignments are typically made in stereo gangs. So, both parameters are initially ganged together. Spin the KNOB and both values change.

```
┌─────────────────┬─────────────────┐
│White Noise      │Main Levels      │
│OUT 1 Wet/Dry 100%│analog  1: 0.0 dB│
│OUT 2 Wet/Dry 100%│analog  2: 0.0 dB│
│OUT 1 Level 0.0dB │digital 1: 0.0 dB│
│OUT 2 Level 0.0dB │digital 2: 0.0 dB│
│   main    meter   inputs           │
└─────────────────┴─────────────────┘
```

Now, let's say you only want to change OUT 1. Press the DOWN CURSOR key to "ungang" the pair. Now spin the KNOB; only the value for OUT 1 changes.

```
┌─────────────────┬─────────────────┐
│White Noise      │Main Levels      │
│OUT 1 Wet/Dry  88%│analog  1: 0.0 dB│
│OUT 2 Wet/Dry 100%│analog  2: 0.0 dB│
│OUT 1 Level 0.0dB │digital 1: 0.0 dB│
│OUT 2 Level 0.0dB │digital 2: 0.0 dB│
│   main    meter   inputs           │
└─────────────────┴─────────────────┘
```

Pressing the DOWN CURSOR key again allows you to adjust OUT 2, while pressing the UP CURSOR key re-gangs the parameters. Gangs are much easier to use than to describe, so take a minute and play with the gangs on this menu page. You will find gangs sprinkled liberally throughout the DSP7000 as their presence facilitates many tasks.

Using the Cursor Keys and the KNOB in the PROGRAM Area

Now, let's investigate the use of the cursor keys and the KNOB in the PROGRAM area *(they work just the same in the Setup Storage area)*. Things are only a little bit different here than in the other areas. The box on the display with the word "banks" in it is called the "bank field." The box below the banks field with the word "programs" in it is called the "programs field." In the PROGRAM area, the UP and DOWN CURSOR keys scroll through programs and the KNOB scrolls through banks when the cursor is in the "bank field" (banks are "manila folders" for programs. *See Banks on page 56*). The SELECT key, the <load> SOFT KEY, and the ENT key all load the program shown in the display with the triangle next to its number *(you may need to press the PROGRAM key again to find the <load> SOFT KEY)*. For example:

Press either the LEFT CURSOR key when the cursor is in the programs field (as on the above screen) to position the cursor over the bank field (as shown to the right).

With the cursor in the bank field, spin the KNOB to scroll through banks.

Press the UP or DOWN CURSOR key to scroll through programs. Spinning the KNOB also scrolls through programs, provided the cursor is in the "programs field."

Press the SELECT key, the <load> SOFT KEY, or the ENT key on the numeric keypad to load the program shown in the display with a triangle next to its number. On the screen to the right, "Singularity" has the triangle next to its number.

Pressing SELECT, <load> SOFT KEY, or ENT would load it and result in this screen. Notice that the upper left-hand corner of the display reflects the fact that "Singularity" is now the currently running program.

The moral of the story? Use the LEFT CURSOR key to position the cursor in the "banks field," then use the KNOB to scroll to the bank from which you want to load a program. Then use the UP and DOWN CURSOR keys to scroll through programs to the particular program you want to load. When you get there, press the SELECT key, the <load> SOFT KEY, or the ENT key.

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In some menus, it will be necessary to enter or change text. For example, you will often change text when saving a new program. The method by which this is done is straightforward, albeit a bit tedious. *To play along, go to the PROGRAM area and press the <save> SOFT KEY. (You may have to press the PROGRAM key a second time to see it.) Press the UP CURSOR key twice, so that the box next to "name" is highlighted and press the SELECT key. To escape from this "pop-up" menu, highlight the "cancel" box and press the SELECT key.*

Here's how it works: Select the item that has the text you want to add or change (with the cursor keys) and press the SELECT key. Now the LEFT and RIGHT CURSOR keys move you through the text string and the CXL key acts as a backspace key, deleting characters as it moves back. Turn the KNOB to scroll through alphanumeric characters. When you arrive at the character you want, stop scrolling and move the cursor past that character. Begin scrolling again for the next character. When you are finished entering your text, press the SELECT key or the ENT key to make it "stick." The list of alphanumeric characters in order is:
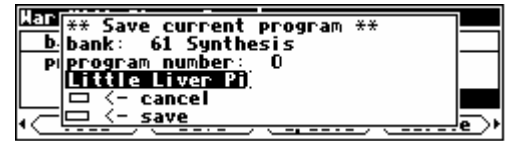
; : / ? > < , ; ` ~ | \ _ = + - } {] [') (* & ^ % $ # @ ! z y x w v u t s r q p o n m l k j i h g f e d c b a *space*
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 . - %

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QUICKSTART OR "NEARLY INSTANT GRATIFICATION"

All right, all right! Areas, displays, SOFT KEYS, parameter this, scroll that. . . BUT WHAT CAN IT DO? Let's cut to the chase and get you up and running! Besides, if you play with the box a good deal before moving on to the finer points of operation, those finer points will stick better to the ol' gray matter. . .

Here are the steps we will take:
1.   First, we'll connect the DSP7000 to the rest of your gear.
2.   On page 20 we'll set the input levels so that things don't distort.
3.   On page 21 we'll learn how to "mute" the DSP7000 in the event of feedback.
4.   On page 22 we'll run programs and "tweak" their parameters.
5.   Finally, on page 24 we'll learn how to save the programs you've "tweaked" for future use.
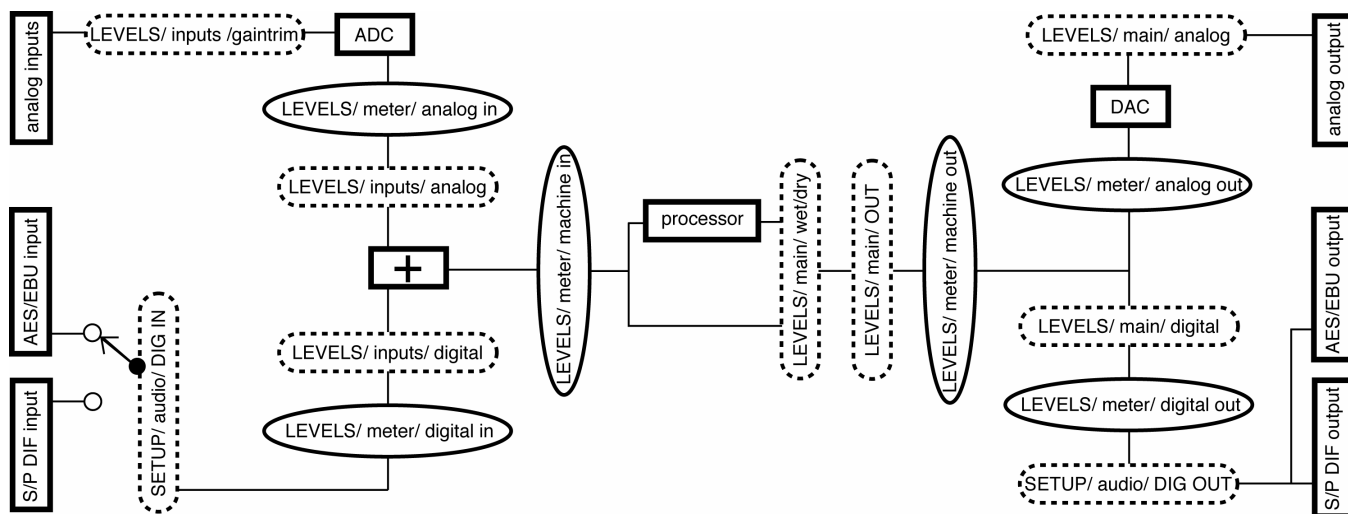
Hooking Up

The diagram above shows the signal flow through the DSP7000 and is discussed in detail on page 28. But before we concentrate on what happens *inside* the DSP7000, we ought to get it hooked up to the rest of your studio. As was stated in the overview, we have two analog inputs, two analog outputs, two digital inputs, and two digital outputs all at our disposal all the time. The analog and digital inputs are summed before processing, and the output of the processor is always available at both the analog and digital outputs.
→ See *The Back Panel* on page 8 for information on the jack types and their specifications.

Hook up the analog inputs to suitable output sources, such as an analog mixer's effect sends or the outputs of a preamplifier. The connections may be made with either balanced XLR connectors or unbalanced 1/4" connectors. You can plug a guitar into the 1/4" jacks, but you will need to turn up the input gain.
→ See *Setting Input Levels* on page 20.

Hook up the balanced analog outputs to suitable input recipients, such as an analog mixer or an amplifier.

Hook up the digital inputs to suitable output sources, such as a DAW (digital audio workstation) or a keyboard with digital outputs. The source of your digital signal must come from the same device (because a sin-

gle cable carries two channels) and is taken from either the AES/EBU input jack <u>or</u> the S/P DIF input jack (see below to learn how to switch between the two).

Hook up the digital outputs to a suitable input recipient, such as a DAW, a sampler, or a DAT machine. While the DSP7000's output will be present at both the AES/EBU jack and the S/P DIF jack, the digital format at both will either be "pro" or "consumer" at <u>both</u> jacks (see below to learn how to switch between the two).

Note: You don't have to hook up all of the inputs and outputs! You can, for instance, feed the DSP7000 with analog inputs and output digitally, or vice versa.

To make sure we aren't stopped before we start, go to the `clock` menu page in the **SETUP** area *(you may have to press the **SETUP** key a few times to find it)*. If you *aren't* using the digital inputs, set the `Source` parameter to `int 48.0 kHz` as shown to the right *(using the **CURSOR** keys and the **KNOB**)*.

```
StereoizingPhaser   audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat:OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:   relay       Word Clock:disabled
   clock  ][  tempo  ][  timer  ][  pedals  ]
```

If you *are* using the digital inputs, select whether the DSP7000 will use the S/P DIF inputs or the AES/EBU inputs with the parameter `DIG IN` on the `clock` menu page in the **SETUP** area.

```
Timeout Spore       audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat:OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:   relay       Word Clock:disabled
   clock  ][  tempo  ][  timer  ][  pedals  ]
```

Next, change the clock `Source` to either `S/P DIF 1/2` or `AES/EBU 1/2` (only one or the other will be available and will reflect your choice for `DIG IN`).

```
Timeout Spore       audio configuration
Source: S/P DIF 1/2 Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat: OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:   relay       Word Clock:disabled
   clock  ][  tempo  ][  timer  ][  pedals  ]
```

Digital outputs are "sent" to *both* the AES/EBU output jack <u>and</u> the S/P DIF output jack. Select the correct format (either "pro - AES/EBU" or "consumer – S/P DIF") with the parameter `DIG OUT`.

```
Timeout Spore       audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat:OK
DIG OUT: AES/EBU     High Speed:disabled
bypass:   relay       Word Clock:disabled
   clock  ][  tempo  ][  timer  ][  pedals  ]
```

The DSP7000 is also capable of sample rate conversion (SRC). That is, it can adjust the sample rate at the digital inputs to match its own internal sample rate. To use this feature, leave the `Source` parameter on the `clock` menu page in the **SETUP** area set to `Int 48.0 kHz` or `Int 44.1 kHz`. Then press the `clock` soft key again and turn `SRC Mode 1/2` to on.

```
Bigger Is Wider     Sample Rate Conv 1
SRC Mode 1/2: on
Status  1/2: OK
Input SR 1/2: 32000?
   clock  ][  tempo  ][  timer  ][  pedals  ]
```

→ To read about the digital setup in more detail, see ***Digital Setup*** on page 33.

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Setting Input Levels

As we're sure you know, getting a high, but not distorted, signal at every point in a signal path is essential. The Level Meters help us to achieve this goal. In the **LEVELS** area go to the `meter` menu page to reach this screen. Adjust `Source` (with the **KNOB** or the

```
War With PhaserGuns meter setup
Source:   analog in
decay time:0.30 sec
peak hold: 1.0 sec

  main      meter     inputs
```

INC/DEC keys) to read either `analog in` or `digital in` depending on which input levels you would like to view. The Level Meters now reflect either the analog or the digital inputs.
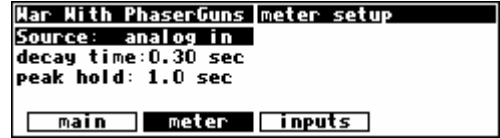
In this cursory introduction, we'll only fiddle with the levels at the inputs but, rest assured, you can change levels anywhere in the signal path.

→ See:
* **Controlling the Level of the Analog and Digital Inputs** on page 29.
* **Wet/Dry Ratios and Output Levels** on page 31.
* **Controlling the Level of the Analog and Digital Outputs** on page 31.

Of course, it's always best to optimize levels at their source (leaving the DSP7000's boost/cut at 0dB). But if you can't, then go to the `inputs` menu page in the **LEVELS** area. There you can boost/cut the analog inputs by +30dB/-90dB *before the analog-to-digital converter* with the `gaintrim` parameter.

```
Bigger Is Wider  Input Levels
analog  1:  0.0 dB  gaintrim 1:  14.0 dB
analog  2:  0.0 dB  gaintrim 2:  14.0 dB
digital 1:  0.0 dB
digital 2:  0.0 dB  dstatus: unlocked
  main      meter     inputs
```

Use the `analog` parameter to cut the analog inputs by 0dB/-100dB *after the analog-to-digital converter*.

```
Bigger Is Wider  Input Levels
analog  1: -1.5 dB  gaintrim 1:   0.0 dB
analog  2: -1.5 dB  gaintrim 2:   0.0 dB
digital 1:  0.0 dB
digital 2:  0.0 dB  dstatus: unlocked
  main      meter     inputs
```

Use the `digital` parameter to cut the digital inputs by 0dB/-100dB.

```
Bigger Is Wider  Input Levels
analog  1: -1.5 dB  gaintrim 1:   0.0 dB
analog  2: -1.5 dB  gaintrim 2:   0.0 dB
digital 1: -7.0 dB
digital 2: -7.0 dB  dstatus: unlocked
  main      meter     inputs
```

Assuming you set the `Source` of the Level Meters to `analog in` or `digital in` on the `meter` menu page in the **LEVELS** area, the meters reflect the input levels (after `gaintrim` is applied, but *before* `analog` or `digital` cuts are made). You want the loudest portions of the signal to approach, but not reach, the red "clip" LED at the top of the Level Meters. If you do clip a signal, you won't hurt the DSP7000, but you will hurt your chances for career advancement - a clipped signal typically sounds nasty. *(Note: because the DSP7000 is a "0dB insertion loss" box, it is possible, though very unlikely, to have undistorted signals at both the analog and digital inputs that become distorted when summed. If this is an issue (e.g., with heavily compressed material), set both the* `analog` *and* `digital` *parameters to* `-3dB`.*)*

→ For more information on setting input levels see **Controlling the Level of the Analog and Digital Inputs** on page 29.

Effecting Things

*"The effect on your affect of the DSP7000's effects
will affect your popularity positively."*
                                                -Anonymous

"Panic" Muting

In a moment you'll be loading and playing with programs, but before you do let it be said that the DSP7000 can produce LOUD sounds with very little warning in *some* of the programs in *some* situations. It would be nice to have a "panic" key to press in

```
Timeout Spore       audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:  S/P DIF      DIG Stat:OK
DIG OUT: AES/EBU      High Speed:disabled
bypass:  mute         Word Clock:disabled
◄  clock  ║ tempo  ║  timer  ║  pedals ►
```

such a situation. Let's arrange things so that pressing the **BYPASS** key mutes all of the DSP7000's outputs. Go to the `clock` menu in the SETUP area. Change the value of the bypass parameter to mute as shown above. Now press the **BYPASS** key. The <u>yellow</u> led next to it will light - you've muted the DSP7000. To un-mute, simply press the **BYPASS** key again.

→ For more information see ***Bypassing and Muting*** on page 37.

Loading Programs

Now, all we need to do is load a program into the DSP7000. To do that, enter the PROGRAM area. You'll see a box that says "banks" and a box that says "programs." Banks are "manila folders" for programs; many

Bank "slot"   Bank name   Number of Programs
                                         in this Bank

```
Delay_M                  program
  banks          41 Vox (12)
  programs       10 B-vox Delays+verb
              ►11 B-vox Pitch+verb
                 12 DualVoxProcess   (⚡)
  ◄( load  )( save  )( update )( delete )►
```

Highlighted Program

Program "slots"   Program names   "Speed" Indicator

programs with a common theme are saved in a single bank. There can be as many as 100 bank "slots" in the internal memory of the DSP7000, and each bank contains 128 program "slots."

The number of program "slots" that can actually "contain" programs is limited to the amount of storage space available.
→ See ***The "Size" of a Program and Its Ramifications for Storage*** on page 57.
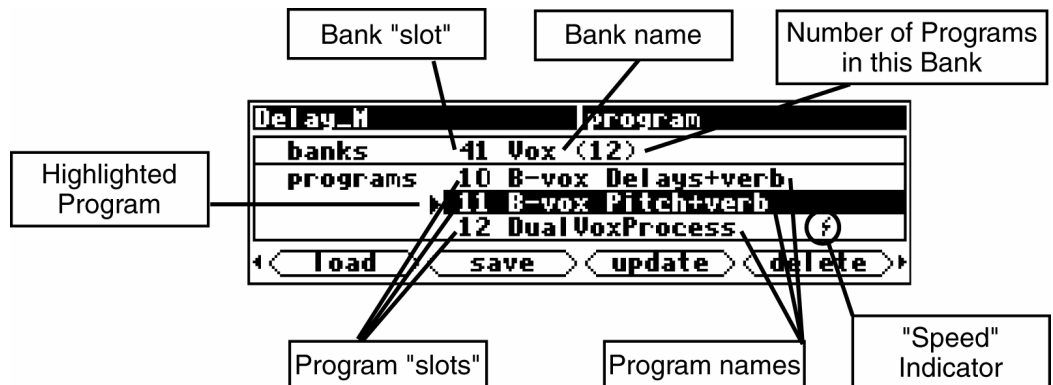
The "Speed" Indicator (slightly like a lightning symbol) indicates that this program can be loaded and run in *high speed* mode, for use at 88.2kHz and 96kHz sampling rates.
→ See ***Sampling Rates*** on page 33 for more information on speed modes.

Use the LEFT CURSOR key to place the cursor in the "banks field" and use the KNOB to scroll through banks. Use the UP and DOWN CURSOR keys to scroll through programs. Use the **SELECT** key, the <load> SOFT KEY, or the **ENT** key to load the highlighted program.

→ For the finer nuances of PROGRAM area navigation read ***Using the Cursor Keys and the KNOB in the PROGRAM Area*** on page 16.

Let's load a program, shall we?

```
Singularity          program
   banks      8 Dynamics (18)
   programs  11 Auto V/O Ducker    ♪
           ▶ 12 Bigger Is Wider     ♪
             13 Bpm FM Trem_S       ♪
 ◀  load   ⟩⟨  save  ⟩⟨ update ⟩⟨ delete ⟩▶
```

Pressing the **SELECT** key on the screen above would load the program "Bigger is Wider." Notice that the upper left-hand corner of the display reflects the fact that "Bigger is Wider" is now loaded on the screen to the right.

```
Bigger Is Wider      program
   banks      8 Dynamics (18)
   programs  11 Auto V/O Ducker    ♪
           ▶ 12 Bigger Is Wider     ♪
             13 Bpm FM Trem_S       ♪
 ◀  load   ⟩⟨  save  ⟩⟨ update ⟩⟨ delete ⟩▶
```

Parameters

Simply loading programs probably won't prove satisfying for too long; you'll want to mess with the parameters on the programs you load. This is accomplished in the PARAMETER area. Very little can be said generally about what you'll find in the PARAMETER area because every program in the DSP7000 is a unique "algorithm." Each unique algorithm (i.e., program) calls for its own unique parameters.

→ To learn more about the "algorithmic" nature of the DSP7000's programs, read the separate Programmer's Manual.

```
Bigger Is Wider    Adust Threshold
Thresh━━▯━━━━━━━  ◀- Adjust until efx
                        moves with rhythm.

  ▐ Setup ▌▐ info ▌
```

A huge number of the DSP7000's LFO's, delay times, reverb decays, etc. are designed to synch to an *system tempo* defined on the tempo menu page in the SETUP area. Say you're working on a song that's at 130 BPM. Simply set the system tempo to 130 and most of the DSP7000's LFO's and delay times will be appropriate for the song. No more calculators. You can also derive the system tempo from a midiclock signal applied to the DSP7000's MIDI input. Simply set Source to Midiclock.

```
B: DuellingDualDlys Tempo
Beat  ▮
Tempo: 130 BPM
Source: Internal
Average: 2 Taps
 ◀ format ⟩⟨ <tap> ⟩⟨ timer ⟩⟨ pedals ⟩▶
```

Parameters that synch to the system tempo are identified by "t_" such as "t_rate" and "t_fmrate" and are adjusted in musical terms such as "whole note" and "dot 1/8". You will find them in the PARAMETER area of most programs.

→ See System Tempo on page 63
→ For loop programs, see System Timer on page 64

```
B: FM Panner        fm panner params
t_rate  : whole note fm depth:  2.00 Hz
t_fmrate: dot 1/8
rate    :  0.42 Hz
fmrate  :  2.67 Hz
 ▐ fm pan ▌▐ info ▌
```

You will *usually* find an info or about menu page in the PARAMETER area. In it, you will find general information about what the program does along with any notes concerning special parameters or "nonobvious things."

```
Bigger Is Wider      info
Energy below 200 Hz (bass notes and
male voices) triggers stereo width
enhancement. Completely compatible:
mono listeners hear original signal.
 ▐ Setup ▌▐ info ▌
```

Many, but by no means all, of the programs in the DSP7000 currently support an "expert mode" feature. The expert mode parameter controlling this feature is found on the misc menu page in the SETUP area (you may have to press the **SETUP** key a few times to find it). A setting of 0 *hides* all but the most relevant menu pages in the PARAMETER area.

```
Bigger Is Wider      misc setup
key hold:    1.0 sec # favorites: 8
expert mode: 0
wordclock:  no
extra sync: no
 ◀ misc ⟩
```

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Conversely, a setting of 9 *reveals* all of the available menu pages in the PARAMETER area. Settings between 0 and 9 reveal an increasing number of menu pages in the PARAMETER area.

Leave expert mode at 9 if you like lots of parameters to tinker with, at 0 if you find lots of parameters annoying, or somewhere in-between if your tastes fall somewhere in-between.

→ See **Miscellaneous Setup Options** on page 66 for information on the other parameters on this screen.

It should also be mentioned that any parameter on any menu page can be "remote controlled" via MIDI or the rear foot pedal jacks. Telling you how to do this entails discussing voluminous topics such as setting up MIDI globals, setting up foot pedal globals, and navigating a "remote control" menu page. Such a discussion wouldn't be in keeping with the concept of this **Quickstart** section.

→ If this really piques your interest, go ahead and read:
- **Setting Up the External Controllers** on page 39.
- **External Modulation and Trigger Menu Pages** on page 42.
- **Remote Controlling Parameters** on page 53.

"Tweaking" and Saving "Tweaks"

Different sets of parameter values for a single program are said to be different "tweaks" of that program. As you play with the parameters on the preset programs, you are "tweaking" those preset programs. For instance, let's say you want a program that mimics the frequency response of your neighbor's television as heard through *your* wall. You want to "tweak" the parameters of a filter program in order to get the correct frequency response.

First, load a basic filter program such as "stereo filter" from the "Basics" bank (not shown here).

```
Filter_0          main parameters
type:  lowpass
freq:  1000.07 Hz
q:     1.0

    main      info
```

Do some long calculations involving transmission coefficients and dispersion laws to arrive at the proper filter cutoff frequency and resonance. Enter them.

```
Filter_0          main parameters
type:  lowpass
freq:  143.87 Hz
q:     1.8

    main      info
```

To avoid going through all of the arduous math the *next* time you want to mimic the frequency response of your neighbor's television, you should save your tweaks as a new program. Press the PROGRAM key to enter the program area.

```
Filter_0              program
  banks        3 Basics (14)
  programs    15 Diatonicshift_0    ⌇
            ▶ 16 Diatonicshifts_4    ⌇
             17 Grafic Eq 10_4      ⌇
◀  load      save    update   delete ▶
```

Press the <save> SOFT KEY. You'll see a pop-up menu with a few options.
The "bank" line allows you to select the bank in which you will save the program.

```
Bi ** Save current program **
 b bank:    3 Basics
 p program number:  0
   ☐  name:Filter_0
   ☐  <- cancel
   ▪  <- save
◀
```

The "program number" line allows you to change which number "slot" you save the program in. Your choices will be all those numbers between 0 and 127 <u>that do not already have a program assigned to them</u> (including the presets!).

By placing the cursor over the "name" line and pressing the SELECT key, you can change the name of the program. Once you've picked a bank, a program number, and a name, place the cursor over the "save" line and press SELECT to go ahead with the save (place the cursor over "cancel" and press SELECT to abort).
→ See **Banks** on page 56.
→ To learn how to enter text, see **Entering or Changing Text** on page 17.

If you were to change the "bank" to "PX-Communication," the "program number" to "36," and the "name" to "Irritating TV," the screen would look like this.

```
Bi ** Save current program **
 b bank:  72 PX - Communication  2)
 p program number: 36
   ▪  name:Irritating TV
   ☐  <- cancel
   ☐  <- save
◀                                    ▶
```

After selecting save, the screen changes to confirm that the program is now saved in the correct bank and in the correct program "slot." *Now you can load your tweak and feel edgy and irritated even when the neighbors are on vacation!*

```
Irritating TV         program
  banks       72 PX - Communication (13)
  programs    20 Shortwave Radio     ⌇
             21 Traffic Report      ⌇
            ▶ 36 Irritating TV      ⌇ U
◀  load      save    update   delete ▶
```

→ To read about using Memory Cards, see **Memory Cards** on page 26.
→ To update a program you have already saved, see **Updating a Program** on page 60.
→ To link programs from different banks (for ease of loading in, say, a live situation), see **"Linking" Programs** on page 61.
→ To compare your tweaks with the saved version of a program, see **Comparing a Currently Loaded Program With The Original (Saved) Version** on page 62.

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So, there you have it. The procedure we followed in this **Quickstart** section is more or less the procedure you will follow whenever you use the DSP7000. First, you'll get an input level, then you'll load a program, then you'll tweak the parameters to "customize" your effect, and then you'll save your tweak for later use. Doing this much will give you an appreciation of the horsepower under the hood of the DSP7000. But *only* doing this much *won't* give you an appreciation of the amazing versatility of the DSP7000:

- In addition to altering levels at the inputs, you can alter and monitor levels at any point in the signal path.
  → See **Controlling Levels** on page 28.

- Programs and "setups" can be saved to and loaded from removable Memory Cards, as well as internal memory.
  → See **Memory Cards** on page 26.

- In addition to loading programs from the front panel, programs can be loaded remotely via MIDI program change messages or external "triggers."
  → See **Loading a Program Remotely** on page 58.

- The digital inputs and outputs have comprehensive sample rate and sync parameters to complement any digital installation.
  → See **Digital Setup** on page 33.

- Any parameter in the DSP7000 can be "remote controlled" via MIDI or the rear panel foot pedal jacks 1 and 2.
  → See **Setting Up the External Controllers** on page 39, **External Modulation and Trigger Menu Pages** on page 42, and **Remote Controlling Parameters** on page 53.

- Existing programs can be altered or entirely new programs can be created in the Patch Editor.
  → See the separate **Programmer's Manual**.

OPERATION

Mounting and Handling

Normally, the DSP7000 will be rack mounted in a standard 19 inch rack. If the rack will be taken on the road, the DSP7000 should be supported at the rear. It is advisable to keep the rack well ventilated and in a dry, dust-free environment so that heat and moisture won't cause degradation of performance. Contrary to some reports, we have found that soda/beer splashed liberally about the front panel does *not* enhance the reliability of the DSP7000. Since the DSP7000 has few internal connectors, it should hold up well under "road conditions."

Memory Cards

All functions that work on internal user memory also work on Memory Cards. A standard Memory Card is 512 kilobytes, although the DSP7000 will support cards up to 4 megabytes. (Note: Memory Cards must be "*PCMCIA type 1 or 2 static RAM card*" - the DSP7000 does not support *"Flash"* cards.) A Memory Card will not maintain memory if the battery dies or if the battery is removed. To change the battery without losing information, change it while it's plugged into a powered-up Harmonizer. A conservative estimate puts the lifetime of a battery at a year. . . Like gambling on the stock market, bet only what you can afford to lose. . .

You can also use the Vsig program (visit www.eventide.com) to save edited presets to disk on a remote computer. This gives you a valuable safety copy.

Eventide and other suppliers can provide rechargeable cards that do not need battery changes. These need to be occasionally placed in the slot of a powered-up system to top up their batteries. Normal use of the card will usually keep the battery charged.

Insert a Memory Card by pushing it into its slot until it "locks" into place. The Memory Card Release will "lengthen," and the display will briefly read `Checking "Memory Card". .` or `Checking "GTR Library". .` or (generally) `Checking "whatever-the-name-of-this-card-is". . .`

Remove a Memory Card by pressing the Memory Card Release - but don't remove a Memory Card when the BUSY LED is lit! A program that was loaded from a Memory Card continues to run even if the Memory Card is subsequently removed. The Memory Card only needs to be in place during PROGRAM and Setup Storage area functions such as `<load>`, `<save>`, `<update>`, `<delete>`, etc.

The BUSY LED is used to indicate that a Memory Card is being written to. However, if there is no Memory Card in place, the BUSY LED indicates data at the MIDI In port or the serial port. You may want to use this latter feature during a session that requires periodic use of a Memory Card. Simply insert the Memory Card when you need to load something from it or save something to it. Remove it when you are done loading or saving, and the BUSY LED will be available for "data indication" or "midi chasing."

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When a Memory Card is inserted, the DSP7000 may report that the card is not formatted and offer to format it. If the Memory Card has already been formatted and the format question is presented, then there is a problem. Try removing and reinserting the card. Try blowing on the business end of the card like an old Atari 2600 game (no spittle!). Formatting will erase all programs and banks on the card! A bank with the name "`Memory Card`" will be created on the card when you format it. Use the `<bank>` SOFT KEY to create new banks on the Memory Card.

→ To manually format a Memory Card, see *Fixing Memory Card Problems* on page 74.

→ To learn how to create a new bank, see *Creating a New Bank or Renaming an Old Bank* on page 57.

→ To find out how much memory is free on a memory card, see *The "Size" of a Program and Its Ramifications for Storage* on page 57.

Note: Like fine china, Memory Cards are fragile:

- Treat them with respect.
- Don't lie to them.
- Don't store them on your dashboard or in your toaster.
- Avoid shocking them with static electricity (or any kind of electricity for that matter).
  → For information about Memory Card problems and how to fix them, see *Fixing Memory Card Problems* on page 69.

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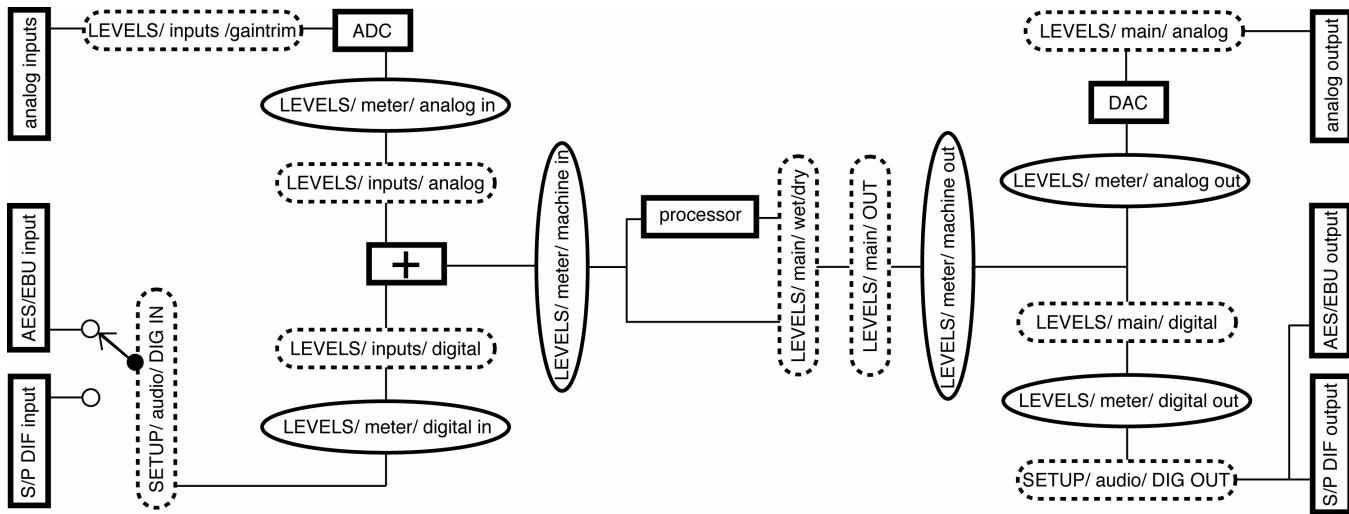
Controlling Levels

The DSP7000's signal flow is diagrammed above. Bold boxes represent physical structures inside and outside the DSP7000, for example, the analog inputs. Dashed boxes represent parameters that impact signal flow or gain structure. For example, "Levels/ main/ analog" represents the `analog` parameter on the `main` menu page in the LEVELS area as shown to the right. Ovals represent points in the signal flow that can be viewed with the level meters.

```
Bass Balls        Main Levels
OUT 1 Wet/Dry 100%   analog  1: 0.0 dB
OUT 2 Wet/Dry 100%   analog  2: 0.0 dB
OUT 1 Level  0.0dB   digital 1: 0.0 dB
OUT 2 Level  0.0dB   digital 2: 0.0 dB
  main     meter     inputs
```

As you can see, the analog and digital inputs are summed or mixed before entering the processor. Further, the AES/EBU and the S/P DIF inputs cannot be used at the same time. The rest is fairly straightforward and will be discussed in detail in the following sections.

The Level Meters

Once you understand the Level Meters, you can adjust levels along the signal path. There are two meters to the left of the display, one for the left channel and one for the right channel. By altering the `Source` parameter on the `meter` menu page in the LEVELS area, you can change the point in the signal path that the meters measure. Your choices are:

```
Oscillator 1k 0 VU  meter setup
Source:   analog in
decay time:0.30 sec
peak hold: 1.0 sec

  main     meter     inputs
```

`analog in`	measure the level at the analog inputs *after* the `gaintrim` (LEVELS / `inputs` / `gaintrim`).
`digital in`	measure the level at the digital inputs *before* the input cut (LEVELS / `inputs` / `digital`).
`machine in`	measure the level at the inputs to the DSP7000's processor.
`machine out`	measure the level at the outputs to the DSP7000's processor.
`analog out`	measure the level at the analog outputs *before* output cuts are applied.

`digital out`   measure the level at the digital outputs *after* output cuts are applied.

The parameter `decay time` determines how long the meters take to go from full "deflection" to zero measuring an impulse. The parameter `peak hold` determines how long the meters hold their highest reading.

```
Oscillator 1k 0 VU │meter setup
Source: digital out
decay time:0.30 sec
peak hold: 1.0 sec

  │ main │   meter │ inputs │
```
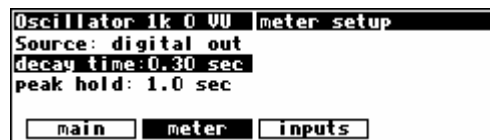
The top-most LED on each meter indicates that the signal is clipping. The LED below the top-most one indicates that the signal is just below clipping (-0.06dB). Each LED below the second falls off at -3dB per decrement, with the exception of the bottom one, which lights if the signal is above -40dB.

You can use the Level Meters to verify that your internal gain structure is in good shape. You generally want to keep levels near, but not touching, the red clip LED. To achieve this, it's always better to boost or cut an *output*. Only if a signal level cannot be optimized by an output boost/cut should you resort to altering an input level!
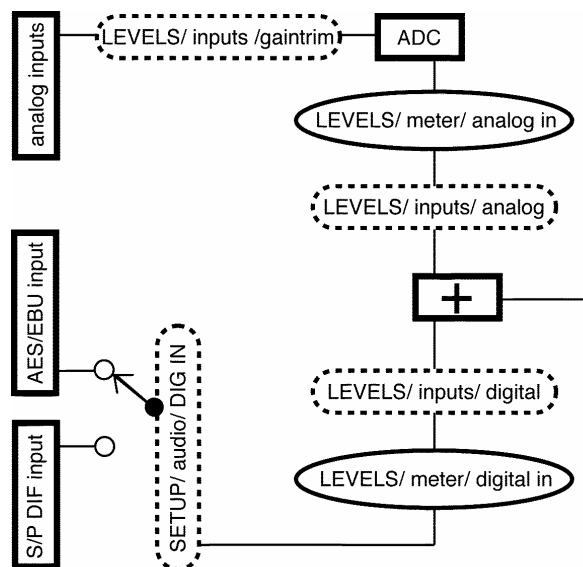

Controlling the Level of the Analog and Digital Inputs

Signals come into the DSP7000 from the outside world via the analog and digital inputs. Adjust the boost/cut of each of these inputs on the `inputs` menu page in the **LEVELS** area. Such boost/cuts will often be made in "gangs," however, you can boost/cut any of the inputs independently of the others by pressing the **DOWN CURSOR** key. Notice that the analog input has two parameters for gain adjustment: one *before* the analog to digital converter (ADC) and one *after* the

ADC. Use the `gaintrim` parameter to get a good analog level into the ADC, and use the `analog` parameter to adjust the loudness of the analog signal relative to the digital signal (assuming that you're using both the analog and digital inputs).

To monitor the input levels, go to the `meter` menu page in the **LEVELS** area. Change `Source` to either `analog in` or `digital in` depending on which you want to monitor.

Again, the analog levels shown on the Level Meters are *after* the `gaintrim` found on the `inputs` menu page.

```
Oscillator 1k 0 VU │Input Levels
analog 1: -1.5 dB  gaintrim 1:  0.0 dB
analog 2: -1.5 dB  gaintrim 2:  0.0 dB
digital 1: 0.0 dB
digital 2: 0.0 dB  dstatus: unlocked

  │ main │  meter │ inputs │
```

This means that it is possible to *overdrive* an input to the DSP7000, decrease that overdriven level with the `inputs` / `gaintrim` parameter, and *show no clipping* on the Level Meters! To avoid such a situation, it is advisable to boost/cut the signals coming into the

```
Oscillator 1k 0 VU │meter setup
Source: digital in
decay time:0.30 sec
peak hold: 1.0 sec

  │ main │   meter │ inputs │
```

DSP7000 at their source. Doing so also results in a better gain structure! The moral ? Use the `gaintrim` parameter on the `inputs` page only as a last resort.
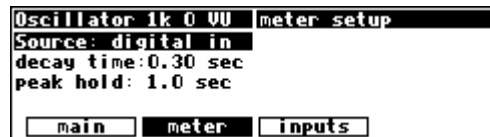
→ Note: All of the parameters discussed in this section can be "remote controlled" via MIDI or the foot pedal jacks. To learn how, read:

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- *Setting Up the External Controllers* on page 39.
- *External Modulation and Trigger Menu Pages* on page 42.
- *Remote Controlling Parameters* on page 53.

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Wet/Dry Ratios and Output Levels For the DSP7000's Processor

To change the wet to dry ratio for each "channel" of the processor, go to the `main` menu page in the LEVELS area. A setting of `0%` ("dry") places the uneffected, summed analog and digital inputs at the outputs (the bottom "fork" in the diagram). A setting of `100%` ("wet") places a completely effected signal at the outputs (the top "fork" in the diagram). Settings between `0%` and `100%` have a greater or lesser degree of uneffected signal at the output. This parameter is typically left at `100%` in most studio situations, while guitarists and their ilk will vary it to achieve a proper wet/dry mix. Note that software versions 3.0 and above have improved wet/dry dynamics: in older versions a 50% mix caused the output voltage to drop by 6dB relative to 0% mix or 100% mix. No more! Now a 50% mix is just as loud as either extreme.

The signal level after the Wet/Dry fork can be cut from 0 to 100 dB with the `OUT Level` parameter.

→ Note: All of the parameters discussed in this section can be "remote controlled" via MIDI or the foot pedal jacks. To learn how, read:
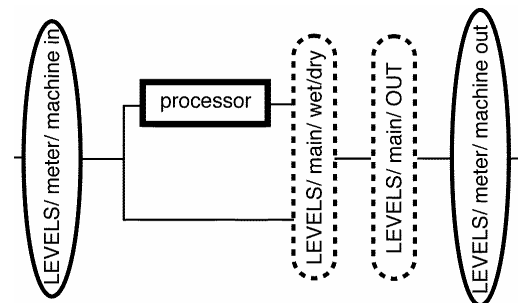- **Setting Up the External Controllers** on page 39.
- **External Modulation and Trigger Menu Pages** on page 42.
- **Remote Controlling Parameters** on page 53.

```
stereo filter      Main Levels
OUT 1 Wet/Dry  48%  analog  1:  0.0 dB
OUT 2 Wet/Dry  48%  analog  2:  0.0 dB
OUT 1 Level 0.0dB   digital 1:  0.0 dB
OUT 2 Level 0.0dB   digital 2:  0.0 dB
    main      meter      inputs
```

Controlling the Level of the Analog and Digital Outputs

You can control the level of the analog outputs and the digital outputs. These adjustments are made to match the DSP7000's output levels to other equipment and would not normally be used as level controls. You should leave these levels set at 0dB where possible in order to get the best possible audio performance out of your DSP7000.
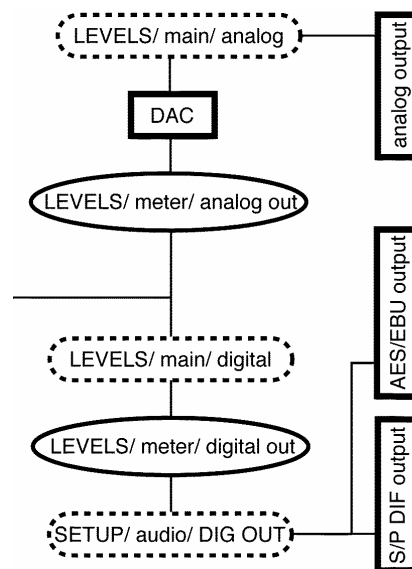
The right side of the `main` menu page in the LEVELS area controls the analog and digital output levels. Adjust the `analog` parameter to adjust the analog outputs from -90 to +3 dB. Be aware that this gain/cut is applied after the output metering and DAC. Adjust the `digital` parameter to cut the digital outputs from 0 to -100 dB.

```
Bass Balls         Main Levels
OUT 1 Wet/Dry 100%  analog  1:  0.0 dB
OUT 2 Wet/Dry 100%  analog  2:  0.0 dB
OUT 1 Level 0.0dB   digital 1:  0.0 dB
OUT 2 Level 0.0dB   digital 2:  0.0 dB
    main      meter      inputs
```

→ Note: Both of these parameters can be "remote controlled" via MIDI or the foot pedal jacks. To learn how, read:
- **Setting Up the External Controllers** on page 39.

- ***External Modulation and Trigger Menu Pages*** on page 42.
- ***Remote Controlling Parameters*** on page 53.

DIGITAL SETUP

Digital Setup Overview

Before we look at the DSP7000's digital setup in detail, let's take in the "big picture."

All of the DSP7000's analog to digital conversion and digital to analog conversion is 24 bit.

The DSP7000 sports two digital inputs and two digital outputs. Unlike the analog inputs and outputs, the digital inputs and outputs must be received or sent in pairs (because a single cable carries two channels). The digital input can come from either the S/P DIF or the AES/EBU jack, but not both. Digital output is seen at both the S/P DIF and AES/EBU outputs, but the format at both jacks is either "consumer" or "pro," but not both.

The DSP7000 assumes that signals at the digital inputs are 24 bit. No harm occurs if the input is in fact less than 24 bit; subsequent processing will fill the lower bits.

The *system sampling rate* is derived from either an internal clock or an external clock. The internal clock rates supplied by the DSP7000 include 44.1kHz, 48kHz, 88.2kHz, 96kHz, and the rate of an optional user-supplied crystal (see page 72) (*note that 32kHz and 44.059kHz are not supplied*). The external clock is taken from the selected digital inputs and can range from ~30kHz to ~50kHz and from ~54kHz to ~99kHz. The digital outputs are at the *system sampling rate*, and all analog to digital and digital to analog conversion is done at the *system sampling rate*.

S/P DIF & AES/EBU

The digital inputs are received at either the AES/EBU input jack or the S/P DIF input jack. To select between the two, use the `DIG IN` parameter on the `clock` menu page in the SETUP area. *For the time being, ignore the other parameters on this menu page.*

```
Timeout Spore        │audio configuration
Source: S/P DIF 1/2  │Sample Rate: 48000
DIG IN:  S/P DIF     │DIG Stat: OK
DIG OUT: S/P DIF     │High Speed:disabled
bypass:  relay       │Word Clock:disabled
  clock  ║ tempo  ║ timer  ║ pedals ▶
```

The digital outputs are seen at *both* the AES/EBU output jack and the S/P DIF output jack. However, the signal at both jacks can only be one *format*: "consumer" (S/P DIF) or "pro" (AES/EBU). To select between the two formats, use the `DIG OUT` parameter on the `clock` menu page in the SETUP area. Put another way, you can connect a cable to the AES/EBU jack, set `DIG OUT` to `S/P DIF`, and still get signal. However, that signal will be in "consumer" format.

```
Timeout Spore        │audio configuration
Source: S/P DIF 1/2  │Sample Rate: 48000
DIG IN:  S/P DIF     │DIG Stat: OK
DIG OUT: S/P DIF     │High Speed:disabled
bypass:  relay       │Word Clock:disabled
  clock  ║ tempo  ║ timer  ║ pedals ▶
```

Note: The digital inputs need not be assigned to the same protocol as the digital outputs, as is shown to the right. In other words, the digital inputs can be received at the AES/EBU input jack and sent to the digital outputs in "consumer" (S/P DIF) format. Or *vice versa*.

```
Timeout Spore        │audio configuration
Source: AES/EBU 1/2  │Sample Rate: 48000
DIG IN:  AES/EBU     │DIG Stat: OK
DIG OUT: S/P DIF     │High Speed:disabled
bypass:  relay       │Word Clock:disabled
  clock  ║ tempo  ║ timer  ║ pedals ▶
```

Sampling Rates

The DSP7000 can operate over a range of sampling rates from 32kHz to 100kHz. Because the higher sampling rates demand more of the signal processing resources, some large presets will

```
Smear                │program
  banks       62 TapTempo (22)
  programs ▶ 10 Eelectronic      ⚡
             11 SmartReverseDelays
             13 SmartTapChain#3   ⚡
◀ load  ⟩ save  ⟩ update ⟩ delete ▶
```

not operate at the higher rates. To allow for this, the DSP7000 has two "speeds," a bit like gear ratios on a car. In the `normal` (lower) speed range, every preset can run, but only sampling rates between 32kHz and 50kHz may be used. In the `high` speed range, some presets cannot run (those which do not have the lightning symbol beside their name on the program screen such as `SmartReverseDelays`), but the whole sampling rate range may be used.

It is recommended that you keep the DSP7000 in the `normal` speed range unless you need to use the higher sampling rates. To change the `speed` mode, go to the `clock` menu page in the **SETUP** area.

```
Timeout Spore         audio configuration
Source: Int 88.2 kHz Sample Rate: 88200
DIG IN:   S/P DIF     DIG Stat:unlocked
DIG OUT: S/P DIF     High Speed:  enabled
bypass:   mute        Word Clock:disabled
◄  clock  ║ tempo ║ timer ║ pedals ►
```

Using the Internal Clock

When you use the "internal" clock, the *system sampling rate* will correspond with the internal clock's sampling rate. The *system sampling rate* is the sampling rate used for all internal processing. If you're using the digital inputs while the *system sampling rate* is set to

```
Timeout Spore         audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat:OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:   mute        Word Clock:disabled
◄  clock  ║ tempo ║ timer ║ pedals ►
```

`Internal`, you must ensure that the clock of the machine being input to the DSP7000 is synced to the DSP7000's digital output or that you have sample rate conversion (SRC) turned `on` (located on the "bottom" `clock` page). If the machine being input to the DSP7000 is *not* synced to the DSP7000's output and SRC is turned `off`, `DIG Stat` is likely to read `slipping` or `unlocked`. That means the two machines are not in sync and that ugly clicks and pops will be added to the audio. In such a situation you'd be better off setting `Source` to `external` or the SRC `on`.

Selecting The Internal Clock's Rate

To select the internal clock, set the `Source` parameter on the `clock` menu page in the **SETUP** area to `Int xx.x kHz`.

```
Timeout Spore         audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:   S/P DIF     DIG Stat:OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:   mute        Word Clock:disabled
◄  clock  ║ tempo ║ timer ║ pedals ►
```

Select the internal clock's rate. Your choices are:

`Int 44.1 kHz`   The rate of standard compact disks. The "44.1 kHz sample rate indicator" is illuminated. The highest reproducible audio frequency is ~20kHz.

`Int 48 kHz`   The "professional" rate. The "48 kHz sample rate indicator" is illuminated. The highest reproducible audio frequency is ~22kHz.

With `High Speed` set to `enabled`, you can also choose:

`Int 88.2 kHz`   Twice the rate of standard compact disks. This raises the highest possible reproducible audio frequency to ~40 kHz. The cost of these "20k +" overtones is a reduction in the size of the programs the DSP7000 can run. Some programs will be "unloadable" when `88.2 kHz` is selected.

`Int 96 kHz`   The new "professional rate" (maybe). This raises the highest possible reproducible audio frequency to ~44 kHz. The cost of these "20k +" overtones is a reduction in the size of the programs the DSP7000 can run.

Some programs will be "unloadable" when `96 kHz` is selected.

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The *actual* value of the system sampling rate can be read on the right-hand side of the screen in the field that reads: "`Sample Rate: xxxxx`." Of course, if you select one of the fixed rates (`44.1 kHz`, `48 kHz`, `88.2 kHz`, or `96 kHz`), the *actual* rate should be the same as the rate you select. This display is actually more useful when using an external clock source.

→ See **Miscellaneous Setup Options** on page 66 for other sync options.

The Status Of The Digital I/Os When Using The Internal Clock

When the internal clock is selected, the sampling rate of the signal at the digital input must be equal to the internal clock's rate to avoid clicks and pops. This will be the case if the device that's connected to the DSP7000's digital inputs is *locked* to the DSP7000's clock via the DSP7000's outputs *or* if you turn the sample rate converter (SRC) on. You can do this on the "bottom" clock menu page in the **SETUP** area. The `DIG Stat` parameter on the "top" clock menu page in the **SETUP** area displays the status of the digital input.

```
Timeout Spore        audio configuration
Source: Int 48.0 kHzSample Rate: 48000
DIG IN:  S/P DIF     DIG Stat:OK
DIG OUT: S/P DIF     High Speed:disabled
bypass:  mute        Word Clock:disabled
◄  clock  ║  tempo  ║  timer  ║ pedals ►
```

The status of the digital inputs will be:

```
Timeout Spore        audio configuration
Source: Int 48.0 kHzSample Rate: 48000
DIG IN:  AES/EBU     DIG Stat: Slipping
DIG OUT: S/P DIF     High Speed:disabled
bypass:  relay       Word Clock:disabled
◄  clock  ║  tempo  ║  timer  ║ pedals ►
```

`slipping`   signal is present, but its sampling rate does not correspond with the internal clock's rate. A digital input that is `slipping` will probably suffer from clicks or distortion. The greater the difference between the internal clock's rate and the digital input's rate, the greater the distortion. Some slipping may be acceptable for monitoring or other noncritical applications.

`OK`   signal is present, and its sampling rate is locked to the internal clock rate. Everything's groovy.

`unlocked`   no signal is present, the signal's sampling rate is very unstable, or something is dreadfully wrong with the signal.

Understanding The "System Sampling Rate And External Sync Indicator" When Using The Internal Clock

The "System Sampling Rate and External Sync Indicator" is the box of five LEDs immediately to the left of the display. The <u>top four</u> LEDs indicate the status of the system sampling rate:

- **Solidly lit**: When one of the top four LEDs is solidly lit, the system sampling rate is exact *(+/- 0.05%) (the LED corresponding to the system sampling rate will illuminate)*.
- **Blinking**: When one of the top four LEDs is blinking, the system sampling rate is between one of the fixed rates (*the LED corresponding to the nearest sampling rate will blink*).

Of course, if you select one of the fixed rates (`44.1 kHz`, `48 kHz`, `88.2 kHz`, or `96 kHz`), the LED corresponding to your selection should light solidly.

○ 96 kHz

○ 88.2

○ 48

○ 44.1

○ EXT

The bottom LED, **EXT**, should not light while using the internal clock.

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Using an External Clock

When you use the "external" clock, the *system sampling rate* will be that of the external digital signal. The *system sampling rate* is the sampling rate used for all internal processing (including the ADC and DAC). The external clock's sampling rate is derived from the digital input. Note: If the digital input is "unlocked" (not connected to a valid digital source), the external clock will be **invalid**. If the external clock is invalid, the system sampling rate will revert to the last valid *internal* clock rate.

Selecting The External Clock

The external clock is usually derived from the digital input, either the `S/P DIF` input or the `AES/EBU` input depending on the parameter `DIG IN`. To set the system sampling rate to the external clock's rate, set the `Source` parameter on the `clock` menu page in the **SETUP** area to `S/P DIF 1/2` or `AES/EBU 1/2` depending on your choice for `DIG IN`. The system sampling rate will now be the sampling rate of the digital input assuming the digital input is valid.

```
Timeout Spore       │audio configuration
Source: AES/EBU 1/2 │Sample Rate: 48000
DIG IN:    AES/EBU  │DIG Stat: OK
DIG OUT:   S/P DIF  │High Speed:disabled
bypass:    relay    │Word Clock:disabled
◀  clock  ║  tempo  ║  timer  ║  pedals ▶
```

Although they are rarely used, an external Word Clock input, a TTL level clock, or a user supplied crystal may also be used as the external clock source. You can `enable` the `Word Clock` parameter on the `clock` menu page or the `extra sync` parameter on the `misc` menu page in the **SETUP** area. With these options enabled, you can select them under the `Source` parameter on the `clock` menu page.
→ See **Connecting user-supplied crystals and external clocks** on page 72 for more information.

The rate of the external clock is displayed in the `Sample Rate: xxxxx` field. In the example shown above, the *actual* frequency of the external signal is `48000` Hz. External sampling rates can range from ~30kHz to ~50kHz in normal speed mode, and from ~30kHz to 53kHz and 61kHz to ~99kHz in high speed mode.
→ See **Sampling Rates** on page 33 for information on speed modes.

The Status Of The Digital I/Os When Using The External Clock

When the external clock is selected, the sampling rate of the signal at the digital input becomes the system sampling rate. The `DIG Stat` parameter on the `clock` menu page in the **SETUP** area displays the status of the digital input.

```
Timeout Spore       │audio configuration
Source: S/P DIF 1/2 │Sample Rate: 48000
DIG IN:    S/P DIF  │DIG Stat: OK
DIG OUT:   S/P DIF  │High Speed:disabled
bypass:    relay    │Word Clock:disabled
◀  clock  ║  tempo  ║  timer  ║  pedals ▶
```

The status of the digital inputs (`DIG Stat` on the `clock` menu page in the **SETUP** area) will be:

`slipping`	signal is present, but very unstable. A digital input that is `slipping` will probably suffer from clicks or distortion. Some slipping may be acceptable for monitoring or other noncritical applications.
`OK`	signal is present and stable. Everything's groovy. *If a signal's sampling rate is not completely stable, its status will read `OK` with brief interjections of `slipping`. This is normal and may well not produce measurable distortion.*
`unlocked`	no signal is present, the signal's sampling rate is very unstable, or something is dreadfully wrong with the signal.

The sampling rate at the digital outputs will be the same as the sampling rate of the digital inputs (which is the system sampling rate in *external*). A/D and D/A conversion will be done at the sampling rate of the digi-
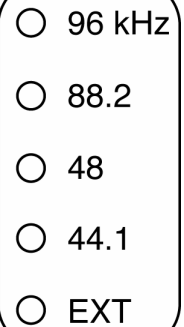
---

tal inputs (which is the system sampling rate in *external*).

The "System Sampling Rate and External Sync Indicator" is the box of five LEDs immediately to the left of the display. The <u>top four</u> LEDs indicate the status of the system sampling rate:

- **Solidly lit**: When one of the top four LEDs is solidly lit, the system sampling rate is exact (+/- *0.05%*) (*the LED corresponding to the system sampling rate will illuminate*).
- **Blinking**: When one of the top four LEDs is blinking, the system sampling rate is between one of the fixed rates (*the LED corresponding to the nearest sampling rate will blink*).

○ 96 kHz

○ 88.2

○ 48

○ 44.1

○ EXT

Use the "Sample Rate" field on the clock menu page in the SETUP area to see the *actual* sampling rate.

```
Timeout Spore        audio configuration
Source: S/P DIF 1/2 Sample Rate: 47996
DIG IN:  S/P DIF    DIG Stat: OK
DIG OUT: S/P DIF    High Speed:disabled
bypass:  relay      Word Clock:disabled
  clock     tempo      timer     pedals
```

The bottom LED, EXT, has three possible states:

- **Solidly lit**: When the bottom LED is solidly lit, digital inputs are locked and all is right with the world.
- **Blinking regularly**: When the bottom LED is blinking regularly, digital inputs are *not locked*. Because digital inputs are not locked, the external clock is invalid. Because the external clock is invalid, the system sampling rate will revert to the last valid *internal* clock rate.
- **Blinking irregularly**: When the bottom LED is blinking irregularly, the digital inputs are slipping, i.e., are very unstable.

BYPASSING AND MUTING

Sometimes you'll find it necessary to bypass the DSP7000. A few bypassing options exist on the clock page in the SETUP area.

```
Timeout Spore        audio configuration
Source: Int 48.0 kHz Sample Rate: 48000
DIG IN:  S/P DIF    DIG Stat:OK
DIG OUT: S/P DIF    High Speed:disabled
bypass:  relay      Word Clock:disabled
  clock     tempo      timer     pedals
```

relay   "Hardwires" each input to its corresponding output, i.e., analog input 1 is connected to analog output 1, digital input 2 is connected to digital output 2, etc. Shows <u>red</u> led when active.

Note: Because the 1/4" analog inputs have no corresponding 1/4" analog outputs, relay effectively mutes those analog inputs that are mated with 1/4" plugs.

electronic   Makes each output of the DSP7000's internal processor the same as its corresponding input. Thus, level changes and gaintrims are still in effect. Shows <u>yellow</u> led when active.

mute   Mutes all the outputs. Shows <u>red</u> led when active.

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Put the DSP7000 into bypass mode by pressing the **BYPASS** key. One of the leds next to it will light and the DSP7000 will be in the bypass mode you selected on the `clock` page in the **SETUP** area. Press the **BYPASS** key again to exit bypass mode.

You can also set up the DSP7000 for remote bypassing under the `external` menu page in the **SETUP** area. Press the `external` soft key repeatedly until you see "`bypass setup`" in the upper right corner. Select a controller for remote bypassing using the `mode` parameter.
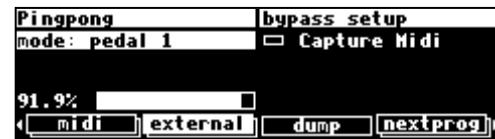
→ See:
- **External Controllers** on page 39.
- **Setting Up the External Controllers** on page 39.
- **External Modulation and Trigger Menu Pages** on page 42.
- **Remote Controlling Parameters** on page 53.

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EXTERNAL CONTROLLERS

External controllers are inputs to the DSP7000 that allow the modulation of parameters from a source outside the DSP7000. These include the foot pedal jacks 1 and 2, the relay jack, and MIDI. In addition to modulating parameters such as delay times, pitch shift, LFO rate, etc., in programs, the external controllers can be used to modulate "box" level parameters such as input levels, Wet/Dry mix, and even screen contrast (why you would *want* to modulate screen contrast no one knows, but it's nice to know you can!).
→ See:

- ***Setting Up the External Controllers*** on page 39.
- ***External Modulation and Trigger Menu Pages*** on page 42.
- ***Remote Controlling Parameters*** on page 53.

In addition, external controllers can be used to advance through programs.
→ See ***Loading a Program Remotely*** on page 58.

Here we will discuss the "global" setup of these external controllers.

Setting Up the External Controllers

Foot Pedals 1 and 2

Each foot pedal jack accepts a *stereo* ("tip-ring-sleeve") 1/4" connector (see diagram below). Between the ring and sleeve is a fixed 5 volts provided by the DSP7000. The foot pedal that is hooked up to the jack and returned between the tip and the sleeve alters that voltage. The `pedals` menu page in the **SETUP** area allows you to calibrate the foot pedal jacks for the particular foot pedals you are using. The "top" menu page calibrates jack 1, and the "bottom" menu page calibrates jack 2 (just press the `pedals` **SOFT KEY** to toggle between the two). The horizontal bar graph at the top of the menu page represents the current foot pedal position relative to the calibration.
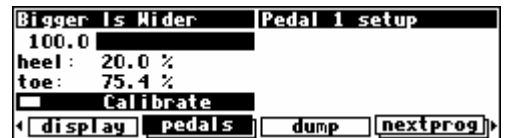
To calibrate your pedal, highlight the `Calibrate` parameter with the cursor and press the **SELECT** key. Rock your foot pedal through its full range of motion, from full minimum ("heel") to full maximum ("toe"), and then press any key. The `heel` and `toe` parameters will jump to reflect their new, calibrated values. You're done. Now when you use that foot pedal to modulate parameters, the minimum foot pedal position will correspond to no modulation and the maximum foot pedal position will correspond to maximum modulation. If you want the opposite to occur (*maximum foot pedal position corresponding with no modulation and minimum foot pedal position corresponding with maximum modulation*), simply calibrate the pedal as discussed above and then *swap* the `heel` and `toe` values.
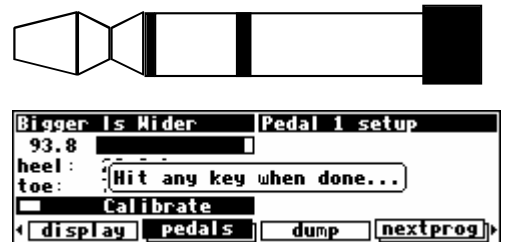
MIDI Setup

In the DSP7000, MIDI can be used:

- with programs that explicitly call for MIDI signals. For example, some programs in the DSP7000 act like synthesizers that a MIDI keyboard can play.
- with programs that explicitly call for some sort of "external" controller. For example, the program "External Detune" calls for an external signal to adjust the amount of detune that is applied to an audio signal. You can direct a MIDI controller to do the adjusting.
- to remote control *any* parameter in the DSP7000 (including input and output levels).
- to change programs via MIDI program change messages.
- to advance to the next program or select the previous program.
- to load programs in sequence.
- to "dump" information from one DSP7000 to another or to an external storage device.
- to control one DSP7000 with another.
- to record parameter changes on a MIDI sequencer for subsequent playback.

There are several MIDI "global" parameters that bear on how all of the above uses of MIDI function. These parameters are found on the `midi` menu page in the **SETUP** area (you may have to press the **SETUP** key a few times to find it). The `midi` menu page is "stacked"; the "top" menu page is shown to the right. Let's look at each parameter in turn, shall we?

MIDI	If set to `disabled`, all received MIDI commands are ignored. However, MIDI *output* messages, including parameter changes, program load, bank change, and the various dump commands, are still enabled. Set this parameter to `enabled` if you want to *receive* MIDI messages.
serial	Enables or disables the serial port. If set to `enabled`, MIDI commands can be received at or sent from the serial port.
program load	This determines whether the DSP7000 will accept and obey MIDI program change messages.
sequence out	If set to `on`, then every time a parameter is changed or a program is loaded, a corresponding message is sent out the MIDI port as a system exclusive message. By recording parameter changes to a MIDI sequencer, you can automate your mixdowns. Simply play back the recorded MIDI sequence at the DSP7000's MIDI input, and you will see the changes you recorded "played" by the sequencer (*assuming MIDI is enabled and system exclusive is on*). However, if you manage to configure the MIDI connections between your various pieces of equipment such that the "system exclusive, sequence out" MIDI messages of the DSP7000 loop back into the DSP7000 without delay, digital demons will unleash a raging fury inside your helpless DSP7000. So,

make sure that doesn't happen! If you aren't actively using the `sequence out` feature, it's wise to leave it `off`.
→ See ***Sequencing With MIDI*** on page 71.

`system exclusive`   If set to `on`, then any system exclusive message that is received by the DSP7000 will be accepted and dutifully obeyed. If set to `off`, then all system exclusive messages will be ignored. This switch does not prevent the DSP7000 from *sending* system exclusive messages, however. *You can use this parameter in conjunction with* `sequence out` *by leaving* `sequence out` `on` *and* `system exclusive` `off` *while recording a sequence, and* `sequence out` `off` *and* `system exclusive` `on` *while playing the sequence back. This eliminates the possibility of those digital demons dancing their mean dance in the DSP7000!*

`device ID`   All system exclusive messages to and from *this* DSP7000 will have *this* `device ID`. If you're using more than one DSP7000, you can set each one's device ID to a different value. This would let them share a common MIDI chain, while allowing system exclusive messages to be sent to a *specific* DSP7000. Normally, the `device ID` is left at `1`, the factory default. You can control one DSP7000 from another by matching their device IDs.
→ See ***Controlling One DSP7000 from Another DSP7000*** on page 70.

Press the ⌇midi⌇ SOFT KEY again to reveal the "second" menu page.

```
A: GuitarTuner    |MIDI setup
MIDI:   enabled   |pressure: channel
base channel:  1  |pitch bend:   0
omni mode:   on   |sysex speed: 10
note mode: poly   |
◀   midi  ||external|| dump  ||nextprog|▶
```

`MIDI`   This is just the same as the `MIDI` parameter found on the "top" menu page. It's duplicated here for your comfort and convenience.

`base channel`   Selects one of 16 MIDI channels to be the base channel from which MIDI channel numbers will be calculated elsewhere in the DSP7000.

`omni mode`   If this is `on`, then a MIDI message on *any* channel is accepted and dutifully obeyed by *every* MIDI message recipient in the DSP7000. This keeps things simple in simple setups. If this is `off`, then every MIDI recipient in the DSP7000 specifies which MIDI channel (offset from the `base channel`) it will accept messages on.

`note mode`   The DSP7000 allows selection of `mono` and `poly` mode. `Poly` means one channel has all the notes (keyboards). `Mono` means each channel plays only one note, but you have multiple channels (MIDI guitars, wind controllers).

`pressure`   If this parameter is set to `channel`, then the last changed MIDI aftertouch message on a given channel affects all the notes played on that channel. If it's set to `key`, then a MIDI aftertouch message on a given channel affects only the note with which it is associated.

`pitch bend`   When using a MIDI keyboard to play a synthesizer program in the DSP7000, this parameter controls how many semitones a maximum MIDI pitchbend message shifts the original pitch.

`sysex speed`   The lower the value of this parameter, the slower the DSP7000 will transmit MIDI messages. This can be useful if the device being sent to is "unhappy" with faster rates.

That's it for MIDI globals. If you press the ⌇midi⌇ SOFT KEY one more time, you'll see parameters pertaining to the serial port's setup. If you press it again, you'll see MIDI group setup.

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*With the Memory Card removed, the **BUSY** LED on the front panel illuminates whenever a message is received at the MIDI In port. If the serial port is "enabled," messages sent out the MIDI Out port are also sent out the serial port. Note: If the serial port is "enabled" and MIDI is "enabled," a command received over either the serial port or the MIDI In port causes the port* not *receiving the command to be ignored until the command is complete.*

External Modulation and Trigger Menu Pages

Many aspects of the DSP7000's operation can be controlled by "external" signals. These "external" signals include MIDI signals and signals at the rear panel foot pedal jacks 1 & 2 (*see **External Controllers** on page 39 to set these controllers up*). The various external modulation and trigger menu pages you will encounter are all variations on a common theme. Although the length of this section might lead you to think otherwise, <u>all you're really doing on these menu pages is selecting the external controller that will modulate or trigger a parameter.</u> If the external controller you select involves MIDI, then you will also have to deal with MIDI channels and (possibly) MIDI control numbers. This adds length to our discussion, but it shouldn't add complexity.

In most cases we're doing one more thing: we're *scaling* the external controller to suit the range of modulation we would like. Again, the concept is simple, but we'll have to get a little wordy in the process of describing it. Apologies. . .

For the sake of providing an example, we're going to externally modulate the `Digital 1` parameter found on the `inputs` menu page in the LEVELS area. Remember, press the DOWN CURSOR key to "ungang" parameters.

```
Stereo 3D CircleDly Input Levels
analog  1:  0.0 dB    gaintrim 1:   15.0 dB
analog  2:  0.0 dB    gaintrim 2:   15.0 dB
digital 1:  0.0 dB
digital 2:  0.0 dB    dstatus: unlocked
    main       meter      inputs
```

With the cursor highlighting `Digital 1` on the `inputs` menu page in the LEVELS area, press <u>and hold</u> the **SELECT** key until the external modulation menu page shown to the right appears. The "SELECT key trick" is how you "remote control" any

```
A: GuitarTuner     digital 1 setup
mode: off          □ Capture Midi
                   range: 100.0 dB
                   type:   absolute
0.0% [========]
◄ *done*                          ►
```

parameter in the DSP7000 and is discussed in depth on page 53. For now, we have a convenient method for getting you to an external modulation menu page. You will also find "explicit" external modulation menu pages in the PARAMETER area (ones that don't require you to press SELECT to see them!) .

Before we do anything else, change the `range` parameter to `-100 dB` (that's negative!). *Don't ask questions, just do it! You'll understand in due time!*

```
A: GuitarTuner     digital 1 setup
mode: off          □ Capture Midi
                   range: -100.0 dB
                   type:   absolute
0.0% [========]
◄ *done*                          ►
```

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The first parameter, `mode,` selects the actual external controller that will do the modulating. Our choices are:

`off`   No external modulation at all.

`high`   This isn't really a *modulator* (it doesn't evolve through time). It pins the parameter at its highest modulation value.

`mid`   This isn't really a *modulator* (it doesn't evolve through time). It pins the parameter at its middle modulation value.

`low`   This isn't really a *modulator* (it doesn't evolve through time). It pins the parameter at its lowest modulation value.

`assign 1, 2, ..., 8`   These are "placeholders" that are assigned to *actual* external modulators on the `external` menu page in the **SETUP** area. Until you understand the concept of "redirection" discussed below, don't pay any attention to these.

→ You can read about redirection in The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 &2 on page 50.

`trigs 1 & 2`   These are "placeholders" that are assigned to *actual* external controllers on the `external` menu page in the **SETUP** area. Until you understand the concept of "redirection" discussed below, don't pay any attention to these.

→ You can read about redirection in The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 &2 on page 50.

`pedal 1 & 2`   The input from the pedals at the rear panel foot pedal jacks 1 & 2. These jacks are setup on the `pedals` menu page in the **SETUP** area.

→ See **Foot Pedals 1 and 2** on page 39 to "set them up."

`tip 1 & 2`, `ring 1 & 2`, and `tip & ring 1 & 2`

When a pedal input is used as a switch input, it can operate in one of two modes, supporting either 2 switches or 3 switches. If *any* controller references "tip&ring" for a given socket, that socket will be in "3 switch" mode, otherwise it will be in "2 switch" mode.

In "2 switch" mode:

- "tip" is high when a switch connected between tip and sleeve is closed.

- "ring" is high when a switch connected between ring and sleeve is closed.

To give an added control input, a third switch may be connected so as to connect both tip and ring to sleeve. This will require a 2 pole switch. (Refer to Drawing). The drawing represents the connections that need to be made with the *wires* that are connected to the tip, ring, and sleeve. Alternatively, the same results may be obtained by pressing the 2 switches simultaneously to simulate the third switch.

In "3 switch" mode:
- "tip" is high when a switch connected between tip and sleeve is closed and the third switch is open. If you're using two switches, "tip" is high when the switch between tip and sleeve is closed but the switch between ring and sleeve is open.
- "ring" is high when a switch connected between ring and sleeve is closed and the third switch is open. If you're using two switches, "ring" is high when the switch between ring and sleeve is closed but the switch between tip and sleeve is open.
- "tip&ring" is high when the third switch is closed. If you're using two switches, "tip&ring" is high when the switch between tip and sleeve is closed *and* the switch between ring and sleeve is closed.
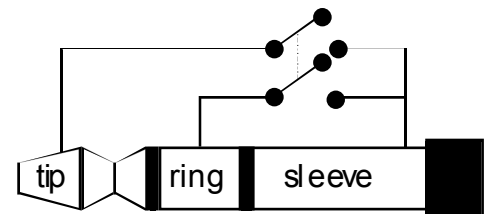
`mod wheel`   MIDI control message 1 - typically assigned to the mod wheel on a MIDI keyboard.

`breath con`	MIDI control message 2 - typically assigned to the breath controller on a MIDI keyboard.
`foot con`	MIDI control message 4 - typically assigned to the foot controller on a MIDI keyboard.
`damper`	Triggers when a damper control message (MIDI control message 64) is received with damper = 1.
`portamento`	Triggers when a portamento control message (MIDI control message 65) is received with portamento = 1.
`sostenuto`	Triggers when a sostenuto control message (MIDI control message 66) is received with sostenuto = 1.
`soft`	Triggers when a soft control message (MIDI control message 67) is received with soft = 1.
`hold 2`	Triggers when a "hold 2" control message (MIDI control message 69) is received with "hold 2" = 1.
`volume`	MIDI control message 7 - typically assigned to volume changes.
`balance`	MIDI control message 8 - typically assigned to balance.
`pan`	MIDI control message 10 - typically assigned to panning.
`expression`	MIDI control message 11 - typically assigned to the expression controller on a MIDI keyboard.

`general 1 through 8`

MIDI control messages 16 through 23.

`MIDI single` Allows selection of any MIDI control number with coarse quantization. Input range is 0 to 127. A third parameter appears, `con`, which selects the controller number to be used.

`MIDI double` Allows selection of any MIDI control number with very fine quantization. Input range is 0 to 16383. A third parameter appears, `con`, which selects the controller number to be used. *Your choices for `con` are 0 to 31. The MIDI control number `con` will pass the "coarse" value for the modulation and the MIDI control number `con` + 32 will pass the "fine" value for the modulation.*

`chan pressure`	MIDI channel pressure message.
`pitch wheel`	MIDI pitch bend message.
`note on`	MIDI keyboard note number. Middle C on an 88 note keyboard gives a value of "60."
`note switch`	Turns on when the specified midi note is received.
`MIDI program`	Triggers when a MIDI program change message is received.
`MIDI Clock`	Modulates as a function of the BPM (beats per minute) of a MIDI clock signal. The

value of this external controller is:

$$(\text{input BPM}) / 480 = \text{value}$$

so 120BPM yields a value of *0.25*, 96BPM yields a value of *0.2*, and so on. This MIDI message is channel-independent.

MIDI start   Triggers when a MIDI start command is received. This MIDI command is channel-independent.

MIDI stop   Triggers when a MIDI stop command is received. This MIDI command is channel-independent.

External Controller Selection

For all of the above MIDI messages, except for those involving "MIDI clock," if omni is set to on on the midi menu page in the SETUP area, then the MIDI message will be accepted on any channel. Although you can highlight the channel parameter here, you cannot change it from omni. You must go to the midi menu page in the SETUP area to change it.

```
Stereo 3D CircleDly|trig 1 setup
mode: note on        ☐ Capture Midi
channel: omni

0.00    [____.____]
◄[  audio  ][ service ][  midi  ][ mod con ]►
```

If omni is set to off on the midi menu page in the SETUP area, then the second parameter on the screen, channel, selects which MIDI channel the MIDI message will be accepted on (relative to the base channel found on the midi menu page in the SETUP area). If the value of base + x is greater than 16, the result "wraps" around. For example, if base channel were set to 10, and channel were set to base + 12, the *actual* MIDI channel used would be

```
Stereo 3D CircleDly|digital 1 setup
mode: mod wheel       ☐ Capture Midi
channel: base + 12  scale: -100.00%
                    digital 1: -100.0 dB
0.00    [____.____]
[  main  ][ meter  ][ inputs ][ *done* ]
```

$$10 + 12 = 22$$

$$22 - 16 = \underline{\mathbf{6}}$$

SIX!

It's worth noting that MIDI commands are often sent on a MIDI connection only if the command being sent differs from the last command sent. Between the occasional command messages are data messages. A data message pertains to the last sent command message. These are known as "Running Status." You could send a MIDI command message to the DSP7000 with the MIDI parameter on the [midi] menu page in the SETUP area set to disabled. If you then change the MIDI parameter to enabled, you must re-send the MIDI command message before the MIDI data messages will be accepted. Try sending a different MIDI command to get things started, or try cycling power on your MIDI source.

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> *"Automatically" Selecting a MIDI External Controller*

As opposed to "manually" selecting a MIDI controller, along with its proper channel and control number, a feature exists that "captures" the first MIDI message sent to the DSP7000 and uses it as the external controller. This works on both external modulation and external trigger menu pages.

On the upper right-hand side of the screen, you will find a function called `Capture Midi`. Highlighting this parameter and pressing the **SELECT** key puts the DSP7000 in "Capture" mode. The `mode` parameter reads "`CAPTURE`."

```
Stereo 3D CircleDly digital 1 setup
mode: CAPTURE        ☐ Capture Midi
channel: base + 12   scale: -100.00%
                     digital 1: -100.0 dB
0.00  [        ]
[ main ] [ meter ] [ inputs ] [ *done* ]
```

The next type of MIDI message received by the DSP7000 will be used for the `mode` parameter, and the MIDI channel that it is received on will be used for the `channel` parameter. Of course, if you are in `omni` mode, the `channel` parameter will remain `omni` regardless of what channel the message is received on. *To exit "Capture" mode without "capturing," just press the SELECT key again.*

For example, if on the screen above (set to "Capture" mode) we send a pitch bend message on channel 3, the screen to the right results. The `mode` is set to `pitch wheel`, and the `channel` is set to `base + 2`. (Our `base channel` in this example is 1, so 1 + 2 = 3. The `base channel` is selected on the "second" `midi` menu page in the **SETUP** area.)

```
Stereo 3D CircleDly digital 1 setup
mode: pitch wheel    ☐ Capture Midi
channel: base + 2    scale: -100.00%
                     digital 1: -49.9 dB
50.00 [███     ]
[ main ] [ meter ] [ inputs ] [ *done* ]
```

At this point, we have discussed all of the parameters that are relevant to *selecting* an external controller for modulation and triggering. If the external controller you would like to use *doesn't* involve MIDI, simply select it with the `mode` parameter. If the external controller you would like to use *does* involve MIDI, you have a choice. You can explicitly enter it with the `mode` parameter, selecting the proper `channel` and, if you've chosen `MIDI double` or `MIDI single`, selecting the `con` number. Alternatively, you can use the `Capture Midi` feature, sending the MIDI signal you would like to modulate or trigger with from your MIDI source and letting the DSP7000 figure out the `mode`, `channel`, and `con`.

Note: To aid in troubleshooting, you can use the BUSY LED as a "MIDI chaser." With the Memory Card removed, any MIDI signals sent to the DSP7000 at the MIDI In port cause the BUSY LED to flash. If you're trying to send MIDI messages to the DSP7000, but the BUSY LED isn't flashing when you do (and the Memory Card is removed), you know something is wrong with the connections outside the DSP7000!

> *Scaling the External Controller*

The remaining parameters on the external modulation menu page pertain to *scaling* the selected external controller to suit the range of modulation desired.

The horizontal bar graph on the bottom of the left-hand side of the screen displays the current value of the controller you selected in `mode` on a scale of approximately 1 to 100. Use this bar graph to visually confirm that the external controller you have selected

```
Stereo 3D CircleDly digital 1 setup
mode: pitch wheel    ☐ Capture Midi
channel: omni        scale: -100.00%
                     digital 1: -49.9 dB
50.00 [███     ]
[ main ] [ meter ] [ inputs ] [ *done* ]
```

is actually "finding its way" to this menu page. If you manipulate your external controller and this bar graph doesn't change, something is wrong! To see how this works, if you select "`mode: pitch wheel`," jiggle the pitch wheel on your keyboard and then leave it alone, you will see the screen shown above. The bar graph reads `50.00`, halfway between full minimum and full maximum.
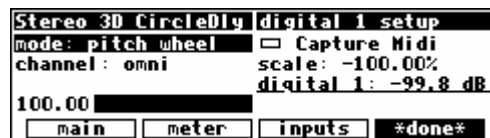
If you pull the pitch wheel all the way down, you'll get the screen to the right. The bar graph reads `0.00`, full minimum.

```
Stereo 3D CircleDly digital 1 setup
mode: pitch wheel    ☐ Capture Midi
channel: omni        scale: -100.00%
                     digital 1: 0.0 dB
0.00  [        ]
[ main ] [ meter ] [ inputs ] [ *done* ]
```

If you crank the pitch wheel all the way up, you'll get the screen to the right. The bar graph reads `100.00`, full maximum.

```
Stereo 3D CircleDly  digital 1 setup
mode: pitch wheel   □ Capture Midi
channel: omni          scale: -100.00%
                       digital 1: -99.8 dB
100.00 ▮▮▮▮▮▮▮▮▮▮
  main     meter     inputs   *done*
```

The next parameter we come to is `scale`. After all this discussion we may have forgotten that what we're actually doing is *modulating a parameter*, but that *is* what we're doing. And parameters come in all shapes and sizes (like people). For example, we must be able to modulate a delay time from 5 milliseconds to 25 milliseconds with a full rock of the foot pedal just as we must be able to modulate a pitch shift from 0 cents to -4800 cents with a full rock of the foot pedal. The `scale` parameter allows us to do just that (*we had you change scale when modulating Digital 1 so that the external controller could actually modulate it*!).

With `scale` set to `100%`, the external controller's range corresponds to the full range of the parameter's values *(different types of parameters will have different "full ranges")*. With various settings of `scale`, the parameter being modulated, and the external controller doing the modulation, it is possible to "pin" the parameter being modulated at its minimum or maximum values. Adjust `scale` or the value of the parameter being modulated to remedy this situation *(see the examples below)*. Note: It is also possible to set `scale` to a negative value. Doing so allows the value of the parameter being modulated to *decrease* while the external controller is *increasing*.

The final parameter on the external modulation menu page is just a duplicate of the parameter we're modulating. Its value reflects the applied external modulation, so you can see the result of all your futzing as you futz *(the external modulation's value will be ADDED to the parameter's value)*. Additionally, you can adjust the value of the parameter while you futz (we'll see why you'd want to in the examples that follow). *If you modulate a gang of four or more parameters, they will* not *be shown on the external modulation menu page because there isn't enough room to fit them all!*

There are two ways that you can obtain your desired range of modulation. The first involves educated guesses and the second involves math. First, we'll give an example using the "educated guess" method. *We're going to ditch the Digital 1 parameter we've been modulating thus far. To avoid future headaches, change the mode to off and then press the [*done*]* **SOFT KEY.**

Load a simple delay program from the "`Delays`" bank if you would like to follow along. We're going to modulate the delay time in this simple program. Highlight a "`delay`" parameter in the PARAMETER area.

```
Delay_M              delay params
level:   -3 db       pan:    0 %
delay: 22000 ms
fback:     0 %
hicut: 20000 hz
  delays     info
```

Press <u>and hold</u> the SELECT key until the menu page shown to the right appears *(again, we're "remote controlling" this parameter)*.

```
Delay_M              delay setup
mode: off            □ Capture Midi
                     scale: 100.00%
                     delay: 22000 ms
0.00 ▮▯▯▯▯▯▯▯▯
  delays     info    *done*
```

Let's say we want to modulate it with the external controller "mod wheel on MIDI channel 3." We could either directly adjust the `mode` and `channel` parameters, or we could use the `Capture Midi` feature to select it.

```
Delay_M              delay setup
mode: mod wheel      ■ Capture Midi
channel: base + 2    scale: 100.00%
                     delay: 32000 ms
0.00 ▮▯▯▯▯▯▯▯▯
  delays     info    *done*
```

Let's also say that we want the `delay` to vary from ***100.0 ms*** to ***300.0 ms***. With the mod wheel at *0* as shown above, we change `delay` to `100 ms`.

```
Delay_M              delay setup
mode: mod wheel      □ Capture Midi
channel: base + 2    scale: 100.00%
                     delay:    100 ms
0.00 ▮▯▯▯▯▯▯▯▯
  delays     info    *done*
```

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With `scale` set to `100.0%`, we find we overshoot our desired value of **300.0 ms** when we advance the mod wheel. *(100% scale will take it to its maximum value, in this case 32000.)*

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 100.00%
                   delay: 31851 ms
99.22 ▮▮▮▮▮▮
  delays  │  info  │  *done*
```

Next, we try `10.0%` for `scale` and find we *still* overshoot big-time when we advance the mod wheel.

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 10.00%
                   delay:  3275 ms
99.22 ▮▮▮▮▮▮
  delays  │  info  │  *done*
```

After a few more trials, we zero in on `0.63%` for `scale` and hit our target. To escape from this page, press the `*done*` SOFT KEY.

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 0.63%
                   delay:   300 ms
99.22 ▮▮▮▮▮▮
  delays  │  info  │  *done*
```

If you'd like to set the "scale" value in a mathematically precise way, here's the equation to know:

(max-parameter-value - min-parameter-value) / full-range = scale

*where **max-parameter-value** is the maximum parameter value you would like, **min-parameter-value** is the minimum parameter value you would like, **full-range** is the "distance" between the possible minimum and maximum parameter values, and **scale** is the value of the parameter* `scale` *(divided by 100). An example is in order, no?*

Let's repeat the above example in a more precise manner.

Let's also say that we want the `delay` *to vary from **100.0 ms** to **300.0 ms**. **100.0 ms** is the **min-parameter-value** and **300.0 ms** is the **max-parameter-value**. With the mod wheel at 0 as shown above, we change* `delay` *to 0 ms (its lowest value) and leave* `scale` *at* `100.0%` *in order to find out the **full-range** of this parameter.*

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 100.00%
                   delay:     0 ms
0.00 ▭▭▭▭▭▭
  delays  │  info  │  *done*
```

With `scale` *set to* `100.0%`*, we advance the mod wheel. We can see that the **full-range** of this parameter is* `31751 ms`*.*

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 100.00%
                   delay: 31751 ms
99.22 ▮▮▮▮▮▮
  delays  │  info  │  *done*
```

Now, with the mod wheel at 0 on the bar graph, we can change `delay` *to* `100.0 ms`*.*

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 100.00%
                   delay:   100 ms
0.00 ▭▭▭▭▭▭
  delays  │  info  │  *done*
```

Recall our equation:

(max-parameter-value - min-parameter-value) / full-range = scale

Plug in our values:

(300.0 - 100.0) / 31751 = 0.006299

In other words, we need to set `scale` *to* `0.6299%`*. Notice that the display then reads* `0.63%` *Although you don't always see all of the digits you type in the DSP7000, it still stores six significant digits!*

```
Delay_M            delay setup
mode: mod wheel    □ Capture Midi
channel: base + 2  scale: 0.63%
                   delay:   100 ms
0.00 ▭▭▭▭▭▭
  delays  │  info  │  *done*
```

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That completes our review of the external modulation menu page. After having investigated all of the parameters on this menu page, we should mention that you will find "stripped down" versions of it scattered throughout the DSP7000.

For example, the program "External Correct" in the "Fix Tools" bank explicitly calls for an external controller. Because the minimum and maximum values have been determined by the program's designer, that option is absent from the menu page. All

```
External Correct    ext_mod setup
mode: off              ☐ Capture Midi

0.00    [        ]
   meter    shift      cal      info
```

that remains is to choose an external controller, and that is done in the same manner as discussed above.

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The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 &2

"Redirection" allows a program developer to use an external controller in his or her program, while allowing you to assign which *actual* external controller is used. An external controller "placeholder" is used in the program, and you fill in a specific external controller for that "placeholder." Redirection also allows you to select a "placeholder" on an external modulation or trigger menu page. If you select the same "placeholder" on several external modulation or trigger menu pages, you can change the *actual* external controller that fills that "placeholder" by making *one* change. If redirection didn't exist, you would need to go to each and every one of those external modulation or trigger menu pages and change the *actual* external controller manually. *Wow ! That's pretty abstract. If it doesn't make sense yet, read through this section and then* re-read *this paragraph.*

There are eight external *assignment* "placeholders": *assign 1, assign 2, ..., assign 8*.
There are two external *trigger* "placeholders": *trig 1* and *trig 2*.

These "placeholders" are selected as the `mode` on external modulation or trigger menu pages littered throughout the DSP7000. For example, *assign 3* can be assigned here. . .

```
A: Filter_0        type setup
mode: assign 3     ☐ Capture Midi
< low >            range:  3 steps
                   type:   absolute
0.0% [        ]    type:   lowpass
   main    info     *done*
```

And here. . .

```
A: TarantulaSlap   delay setup
mode: assign 3     ☐ Capture Midi
< low >            range: 2000 ms
                   type:   absolute
0.0% [        ]    delay :    0 ms
◀  *done*                           ▶
```

And here. . .
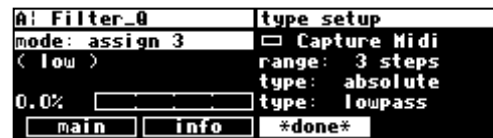
```
A: Eurhetemec      diff setup
mode: assign 3     ☐ Capture Midi
< low >            range:  100 %
                   type:   absolute
0.0% [        ]    diff  :    0 %
  preamp   verb     info   *done*
```

And anywhere. . . You see that a single "placeholder" can modulate or trigger many different parameters.

A single "placeholder" is "filled" by an *actual* external controller at *one* place: the external menu page in the SETUP area. A single "placeholder" is "filled" by *only* one *actual* external controller. In the example screen shown to the right, the *actual*

```
A: Eurhetemec      assign 3 setup
mode: mod wheel    ☐ Capture Midi
channel: omni

0.0% [        ]
◀  midi   external   display   pedals ▶
```

external controller `mod wheel` has been selected to "fill" the "placeholder" *assign 3*.
Now all of the "and here. . ." example screens shown above would *actually* be modulated by the <u>mod wheel</u>!

Moreover, the value in parenthases above, `(low)`, would change to `(mod wheel)`.

```
A: GuitarTuner     digital 1 setup
mode: assign 3     ☐ Capture Midi
< mod wheel >      range: 100.0 dB
                   type:   absolute
100.0% [        ]
◀  *done*                           ▶
```

The external menu page is "stacked." Press the external SOFT KEY repeatedly to cycle through menu pages for *assign 1*, *assign 2*, *assign 3*, ..., *assign 8*, *trig 1*, and *trig 2*. These menu pages behave just like those that were discussed in

```
A: Eurhetemec      trig 1 setup
mode: note on      ☐ Capture Midi
channel: omni

0.0% [        ]
◀  midi   external   display   pedals ▶
```

External Modulation and Trigger Menu Pages on page 42, except that there is no `scale` parameter. This makes sense because a single "placeholder" can be selected to externally control a multitude of parameters. "Scal-

---

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ing" is done on the external modulation or trigger menu pages littered throughout the DSP7000 that have as their `mode` the "placeholder."

So, "redirection" allows you to configure your external modulation and trigger menu pages to suit the particulars of your studio/rack setup. Let's say you frequently use a foot pedal, the pitch wheel, the mod wheel, and MIDI controller 10 (pan) to do external modulations and MIDI note on and MIDI start to do external triggers. Instead of explicitly assigning all of these external controllers on external modulation and trigger menu pages in the programs that you save, you could instead assign *assign 1, assign 2, assign 3, ..., assign 8, trig 1,* and *trig 2.* Then go to the external menu page in the SETUP area and assign the foot pedal to *assign 1*, the pitch wheel to *assign 2*, the mod wheel to *assign 3*, MIDI controller 10 to *assign 4*, MIDI note on to *trig 1*, and MIDI start to *trig 2*.

<u>Here are the benefits</u>: If you take the DSP7000 on the road and need to use different external controllers, you don't have to re-edit all of the programs you use. Instead, just reassign the "placeholders." If you take the DSP7000 to a foreign studio with a different set of "convenient" external controllers, you don't have to re-edit all of the programs you use. Instead, just reassign the "placeholders." If you get a new sequencer that has different "convenient" controllers than the ones you've been using, you don't have to re-edit all of the programs you use. Instead. . . All right. You get the idea.

Let's run through an example to make sure we're clear about what's going on here. While we're going to use placeholders to modulate system-level parameters, you would normally use them to modulate parameters in programs such as feedback, chorus level, pitchshift, etc.

Let's highlight `Digital 1` on the inputs menu page in the LEVELS area. Remember to press the DOWN CURSOR key to "ungang" parameters.

```
Warm Shift          Input Levels
analog  1:  0.0 dB   gaintrim 1:  15.0 dB
analog  2:  0.0 dB   gaintrim 2:  15.0 dB
digital 1: 0.0 dB
digital 2: 0.0 dB    dstatus: unlocked
    main      meter      inputs
```

Press <u>and hold</u> the **SELECT** key for one second. The menu page to the right appears.
→ To change the "one second hold time," see ***Miscellaneous Setup Options*** on page 66.

```
Timeout Spore       digital 1 setup
mode: off            ☐ Capture Midi
                     range: 100.0 dB
                     type:  unipolar
0.0%
    main      meter      inputs     *done*
```

Set the `mode` to `assign 3` and `range` to `-100.0%`. Then press the *done* soft key.

```
Timeout Spore       digital 1 setup
mode: assign 3       ☐ Capture Midi
< low >              range: -100.0 dB
                     type:  absolute
0.0%
    main      meter      inputs     *done*
```

Next, let's highlight `OUT 1 Wet/Dry` on the main menu page in the LEVELS area. Remember to press the DOWN CURSOR key to "ungang" parameters.

```
Warm Shift          Main Levels
OUT 1 Wet/Dry 100%   analog  1: -32.0 dB
OUT 2 Wet/Dry 100%   analog  2: -32.0 dB
OUT 1 Level 0.0dB    digital 1:  0.0 dB
OUT 2 Level 0.0dB    digital 2:  0.0 dB
    main      meter      inputs
```

Press <u>and hold</u> the **SELECT** key for one second. The menu page to the right appears.
→ To change the "one second hold time," see ***Miscellaneous Setup Options*** on page 66.

```
Timeout Spore       OUT 1 Wet/ setup
mode: off            ☐ Capture Midi
                     range: 100%
                     type:  absolute
0.0%
    main      meter      inputs     *done*
```

Set the `mode` to `assign 3` and `range` to `-100.0%`. Then press

```
Timeout Spore       OUT 1 Wet/ setup
mode: assign 3       ☐ Capture Midi
< low >              range: -100%
                     type:  absolute
0.0%
    main      meter      inputs     *done*
```

the `*done*` soft key.

At this point, we've assigned the "placeholder" *assign 3* to modulate <u>both</u> `Digital 1` and `OUT 1 Wet/Dry`. Now, let's "fill in" this "placeholder" with an actual external controller.

Go to the `external` menu page in the **SETUP** area. Press the `external` SOFT KEY repeatedly until you see "`assign 3 setup`" in the upper right-hand corner.

```
Timeout Spore      |assign 3 setup
mode: low          | ▭ Capture Midi

0.0% [        ]
◄[  midi ][ external ][  dump ][nextprog]►
```

You can set `mode` to anything you like; we're going to set it to `mod wheel` on `channel base + 4` (*the* `omni` *parameter on the* `[midi]` *menu page in the* **SETUP** *area needs to be set to* `off` *in order to assign a specific channel*).

```
Timeout Spore      |assign 3 setup
mode: mod wheel    | ▭ Capture Midi
channel: base + 4

0.0% [        ]
◄[  midi ][ external ][  dump ][nextprog]►
```

Now, when you move the mod wheel on MIDI channel "base + 4," both `Digital 1` and `OUT 1 Wet/Dry` are modulated! *(Select the MIDI* `base channel` *on the [midi] menu page in the SETUP area.)*

```
Warm Shift         |digital 1 setup
mode: mod3         | ▭ Capture Midi
                   | scale: -100.00%
                   | digital 1: -51.6 dB
51.56 [█      ]
[  main ][ meter ][ inputs ][ *done* ]
```

```
Warm Shift         |OUT 1 Wet/ setup
mode: mod3         | ▭ Capture Midi
                   | scale: -100.00%
                   | OUT 1 Wet/Dry  48%
51.56 [█      ]
[  main ][ meter ][ inputs ][ *done* ]
```

The very first time you switch the DSP7000 on, you will find that assigns 1-8 are set to `high` - this is so that any programs which use one of these as a volume control input are not silenced. It is recommended, for the same reason, that, if you change these settings and then want to remove the change, you set them back to `high`, rather than to `off`.

Remote Controlling Parameters

Parameters can be remote controlled via MIDI or the rear panel foot pedal jacks. To remote control a parameter, first highlight it with the cursor. In our example, we're going to remote control the parameter `delay` in the program "mono delay" (found in the "Delays" bank).

```
mono delay        delay params
level:    -3 db   pan:    0 %
delay: 20000 ms
fback:     0 %
hicut: 20000 hz
   delays     info
```

With the cursor in place, press <u>and hold</u> the **SELECT** key until the screen changes to the "remote control" menu page. After pressing and holding the SELECT key on the parameter `delay` above, we arrive at the external modulation menu page shown to the right.

```
mono delay        delay setup
mode: off         □ Capture Midi
                  scale: 100.00%
                  delay: 20000 ms
0.00   □━━━━━━━━━━━┑
   delays     info    *done*
```

This is the same menu page we discussed *ad nauseam* in **External Modulation and Trigger Menu Pages** on page 42. We won't rehash it here.

→ To change the "hold time," see **Miscellaneous Setup Options** on page 66.

We can exit this screen by pressing the `*done*` SOFT KEY. You may notice that the DSP7000 flashes, "Control will be lost if preset is not saved" if the parameter you are remote controlling belongs to a program (as opposed to a "global" parameter such as an input level). This means that you must

```
mono delay        delay setup
mode: mod3        □ Capture Midi
                  scale: 100.00%
                  delay: 20000 ms
65.62  ■━━━━━━━━━━┑
   delays     info    *done*
```

`<save>` or `<update>` the program to ensure that your remote control will still be there the *next* time you load the program. Of course, if you don't care if the remote control is there the next time you load the program, then don't worry about it!

→See **Saving a Program** on page 59, and **Updating a Program** on page 60.

Assuming that the `mode` on the above menu page was set to something other than `off` when you exited, `delay` will be underlined. This indicates that it is remote controlled.

The underline blinks to add an element of fun and excitement to

```
mono delay        delay params
level:    -3 db   pan:    0 %
delay:  4062 ms
fback:     0 %
hicut: 20000 hz
   delays     info
```

the DSP7000's display and to cheer you up when you're feeling glum. You can return to the remote control menu page by highlighting `delay` and holding the SELECT key again. If you change the `mode` to `off` on the "remote control" menu page, `delay` will no longer be underlined and nothing will blink.

MIDI Groups

The use of "MIDI groups" allows an alternative way to control the DSP7000 from MIDI, with the minimum of setting up. A MIDI group is a numbered sequence of MIDI controllers, for example 70,71,72...77. When the DSP7000 has been told to respond to this group, these controllers will correspond to the parameters on the DSP7000's screen. This allows a multi-controller such as the Peavey PC1600 to control the DSP7000 with very little configuration required.

For example, referring to the parameter screen at the right, the MIDI group from 70-77 would give you the following results:

```
Basement Drums    reverb parameters
predelay   :100 ms  hi decay:0.0 dB
decay time :1.9 sec hi freq :4000 Hz
room size  :70.1 %  lo decay:-20.0 dB
diffusion  :10.0 %  lo freq :100 Hz
 ◄ reverb     in eq    out eq   expert ►
```

70	predelay	74	hi decay
71	decay time	75	hi freq
72	room size	76	lo decay
73	diffusion	77	lo freq

Each parameter would be controlled over its full range - for example, in this preset `lo freq` has a minimum value of 10 (Hz) and a maximum value of 1000 (Hz). This means that the minimum MIDI value (0) would give you 10 (Hz) and the maximum MIDI value (127) would give you 1000 (Hz).

In this example, using a MIDI *single* controller, the resolution will be limited to the 128 steps offered by MIDI, meaning that the minimum change possible is (1000-10)/128 or about 8Hz. MIDI *double* controllers (numbered 0 to 31) will give better resolution.

If you then changed to a different screen, say main under LEVELS, the following would apply:

70	OUT 1 Wet/Dry	74	analog 1
71	OUT 2 Wet/Dry	75	analog 2
72	OUT 1 Level	76	digital 1
73	OUT 2 Level	77	digital 2

```
Delay_M            Main Levels
OUT 1 Wet/Dry 100%  analog  1: -32.0 dB
OUT 2 Wet/Dry 100%  analog  2: -32.0 dB
OUT 1 Level 0.0dB   digital 1:  0.0 dB
OUT 2 Level 0.0dB   digital 2:  0.0 dB
    main      meter     inputs
```

The MIDI group will continue to control whichever screen is displayed. This looks useful - how do we set up such a MIDI group ? Move on to the next page ….

Configuring the MIDI Group

The last page in the midi menu page 'stack' in the **SETUP** area controls the MIDI group. This operates just like any of the DSP7000's other controller screens, with some added features:

- The parameters on this screen cannot be controlled by way of the MIDI group. There's a reason for this …

- The controller number `con` is the first controller number in the group. This is most usefully set up by MIDI capture. **See page 46 for more on MIDI capture.**

```
Delay_M               MIDI group setup
mode: MIDI single     □ Capture Midi
channel: omni         operation:  2-way
con: 0 bank change    group size: 8
0.00                  active con: 0
◄  audio    service    midi    mod con ►
```

- The `group size` is the number of controllers in the group. For example, in the screen at the right, the group is from 70 to 77. This is a useful location for the group, as these controllers are unassigned by the MIDI specification and not generally used.

- The `active con` displays the number from 1 to `group size` of any member in the group that changes. This is useful as a way of checking that the group is set up correctly and is acting on received MIDI signals.

- If `operation` is `normal`, the external controller will directly control the parameters on the current screen. This sounds right, but can cause problems when moving from screen to screen. For example, suppose you are using a fader-based controller like the Peavey 1600 and you push the fader all the way up to control, say, a vibrato depth. Then you switch to another screen where the same fader controls the master output level. The minute you touch the fader, the level will go way up and the floor will be covered with bits of loudspeaker. This can be prevented by setting `operation` to `sticky`.

- If `operation` is `sticky`, each member in the group can only be changed by moving the controller through its current position - the value will then *stick*, and respond to further movements of the controller. Looking at the top right of the screen, you will see a small thermometer. The arrow shows the direction to move the controller to pass through the current value, while the vertical bar is the position of the current value. Once the current value has been reached, the thermometer will disappear and you will have full control.

```
Amp-u-lation           →
Threshold: -15.0 dB  Decay: 0.500 Sec
Ratio:    6:1
Gain: 0.0 dB
Attack: 0.010 Sec
   Comp       Eq        info
```

- If operation is `2-way`, the DSP7000 will operate in `normal` mode, but will also send MIDI signals out on the same controller channels which can be used to update the external controller. This would mainly be used with a device featuring LED encoders or motor-driven faders to display the effect of changes made at the 7000, for example, when screens are changed.

PROGRAM LOAD, SAVE, DELETE, ETC.

"...the DSP7000 is like a jungle gym for sine waves..."
-Anonymous

Programs are the "algorithms" used by the DSP to process signals. Programs are stored in the DSP7000 much like files are stored on your computer's hard drive. Instead of using a hard drive, however, the DSP7000 uses RAM memory, either internally or on a card. *(A battery preserves the memory when the DSP7000 is powered down.)* The load times are much faster and the unit is more durable and quiet than it would be if a hard drive were used. When you want to use one of the DSP7000's programs, you "load" it.

You can save a program that is running in two ways:
> The first is to simply <save> it - you won't overwrite the old version of the program.
> The second way to save a program is to <update> it - you will overwrite the old version of the program.

Of course, you can delete a program from memory if you wish *(you will quickly find out that you cannot delete the presets that came with the DSP7000).*

Banks

A "bank" is like a manila folder for programs. Instead of just giving you a pile of programs from which to load, the DSP7000's memory is divided into *banks*. There can be as many as 100 banks in internal memory and 100 banks on a given Memory Card. Each bank has 128 "slots" in which to store programs. Programs with a common theme are usually stored in a single bank. For instance, you will find a bank of "Delays," a bank of "Reverb Rooms," and a bank of "Remix Tools." To scroll through the available banks, use the LEFT and RIGHT CURSOR keys to place the cursor in the banks field, then spin the KNOB.

To access banks on a Memory Card, simply scroll past all of the internal banks. Alternatively, you can type the "minus" key on the NUMERIC KEYPAD and then the number of the Memory Card bank you want (pressing ENT when you're done). Notice that a "C" appears in the "banks" field to indicate that the displayed bank is on the Memory Card.

→ See **Memory Cards** on page 26.
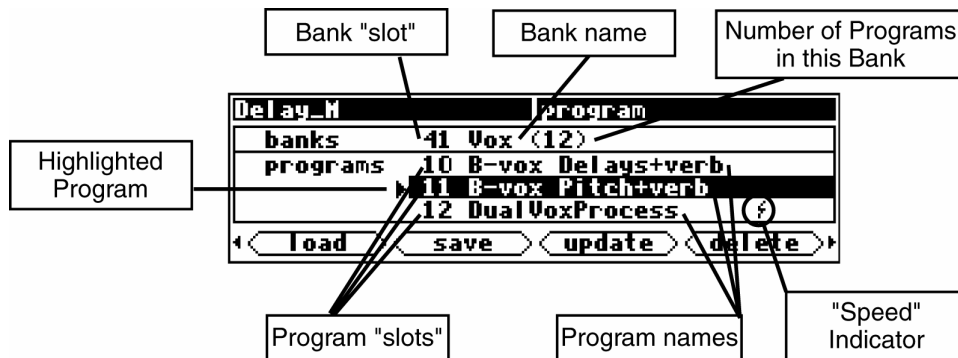
Creating a New Bank or Renaming an Old Bank

As far as the DSP7000 is concerned, there are always 100 internal banks and 100 Memory Card banks. However, you can't save to banks that have never been named. This means that "creating" a bank amounts to naming one that has never been named before. To name a bank, press the <bank> SOFT KEY in the PROGRAM

```
Vox ** Name a bank **
 b bank number:  4
 p   name:Beat Counter
place:internal
     <- cancel
     <- save
```

area (if you don't see this SOFT KEY, press the PROGRAM key again). Doing so will call up the screen shown on the right. The second line, "bank number," allows you to select the bank "slot" you want to name. If the slot you select has been named at some time in the past or currently has a name, you will be *renaming* it. If the slot you select has never been named before, you will essentially be *creating* a new bank in that slot. The third line, "name," allows you to modify an existing name or enter a new one. The fourth line, "place," determines whether you're naming a bank in internal memory or on the Memory Card. When you are satisfied with the bank number, name, and place, highlight the box next to "save" and press the SELECT key to confirm. If you get cold feet, you can place the cursor over "cancel" and press the SELECT key to abort. You can rename the factory banks if it amuses you, but not the factory programs !

→ See **Entering or Changing Text** on page 17.

The "Size" of a Program and Its Ramifications for Storage

Finite things overrun the world we inhabit. There <u>is</u> a limit to the space available in the DSP7000 for the storage of programs. Not everything is perfect. Roughly 500 kilobytes of space is available for storing *your* programs internally. A program typically requires between 1 kilobyte and 16 kilobytes of space, so that in the worst case you can store 30 programs in internal memory. A more realistic number might be 100. If that's not enough for you, don't despair! You can save programs on Memory Cards that can contain as much as 4,000 kilobytes of space! And if you fill up one Memory Card, you can always get another.

→ See **Memory Cards** on page 26.

To find out how "large" a program is and how much free space remains either internally or on the Memory Card, press the <info> SOFT KEY in the PROGRAM area. On the screen to the right, the program "Voxplate / Chorus" requires 6,662 bytes of storage space *(a "kilobyte" is 1024 bytes)*. If the bank selected

```
Voxplate / Chorus  program
ban       Program info:
pro 6,662 bytes needed for save   U
    480,398 bytes are available    U
         (any key to continue)
  info  )(  bank  )(  link  )(compare)
```

on the screen before you pressed the <info> SOFT KEY was an *internal* bank, then the available space displayed is the available internal space. Similarly, if the bank on the screen before you pressed the <info> SOFT KEY was a *Memory Card* bank, then the available space displayed is the available space on that Memory Card.
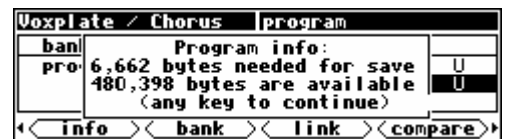
Loading Programs

Programs are loaded by first selecting a program to load in the PROGRAM area. You select a program to load by scrolling through banks with the LEFT and RIGHT CURSOR keys in conjunction with the KNOB and then scrolling through programs with the UP and DOWN CURSOR keys. When the program you

```
AMS DMX Guitar     program
 banks      4 Beat Counter (4)
 programs  10 Gaspodes Dly_m    ⚡
         ▶11 Gaspodes Dly_s     ⚡
          12 Gaspodes Pndly_m   ⚡
   load  )(  save  )( update )( delete )
```

want to load is highlighted, press the SELECT key, the <load> SOFT KEY, or the ENT key.

→ This is described in excruciating detail in **Using the Cursor Keys and the KNOB in the PROGRAM Area** on page 16.
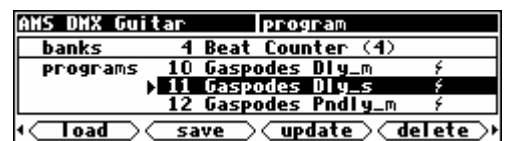
! NOTE ! Some larger programs, those not marked with a lightning flash, will be unavailable for loading when the system is in high speed mode. In the screen on the right, the line through "BeyondTheStars" indicates the unavailability, the "F!" (for Fast!) tells you why.

→ See: **Sampling Rates** on page 33 for more information on speed modes.

The last few programs to be loaded are also saved as *links* in the "Favorites Bank," bank 0. This means that you can quickly revisit the programs that you are currently using, without having to look through all the banks to find them again. These *links* are created automatically by the DSP7000, with the most recent programs at the top, and cannot be modified. You can, of course, permanently save your own links or programs in this bank.

→ See: **"Linking" Programs** on page 61 for more information on *links*.
Miscellaneous Setup Options on page 66 to change the number of "favorites" displayed.

Loading a Program Remotely

There are two ways to load programs remotely. The first is via a MIDI program change message, and the second is by triggering the DSP7000 to load the next or previous program in the current bank. Let's discuss them in turn, shall we?

Loading A Program Via A MIDI Program Change Message

The DSP7000 will change programs within the current bank upon receiving a MIDI Program Change message. A MIDI Program Change message can be sent by a MIDI keyboard, a MIDI sequencer, or a MIDI foot pedal. Using a MIDI foot pedal on stage makes loading programs a breeze.

The current bank referred to above is the one displayed in the PROGRAM area.

In order for this feature to work, the parameter MIDI on the `midi` menu page in the SETUP area must be set to enabled, and the parameter program load on the same menu page must be set to on.

The program that is loaded will be the one whose number is sent in the Program Change message. If the number is not that of a program in the current bank, no program will be loaded.

Note: To aid in troubleshooting, you can use the BUSY LED as a "MIDI chaser." With the Memory Card removed, any MIDI signals sent to the DSP7000 at the MIDI In port cause the BUSY LED to flash. If you're trying to send MIDI Program Change messages to the DSP7000, but the BUSY LED isn't flashing when you do (and the Memory Card is removed!), you know something is wrong with the connections outside the DSP7000!

Changing Banks Via A MIDI Controller Message

To be able to load any given program using a MIDI Program Change message as described above, you may need to change the current bank. This can be done using MIDI Controller #0, which is normally unused. Some MIDI devices may not be able to use MIDI Controller #0, in which case there is a SYSEX (System Exclusive) message that can be used. For information on SYSEX messages, visit www.eventide.com.

In order for this feature to work, the parameter MIDI on the `midi` menu page in the SETUP area must be set to enabled.

If the current bank is on a Memory Card, the new bank will be selected on the Memory Card, otherwise the new bank will be selected from one of the Internal Banks. If the bank number contained in the MIDI Controller #0 message does not exist, no action will be taken.

Triggering the Next or Previous Program To Load

The DSP7000 can also advance to the next program (from the one that is currently loaded) or return to the previous program (from the one that is currently loaded) upon receipt of a "trigger" signal.

On the `nextprog` menu page in the **SETUP** area, you'll find an external trigger menu page. The "top" menu page selects a trigger to load the next program, and the "bottom" menu page selects a trigger to load the previous program (press the `nextprog` **SOFT KEY** to toggle between the two).
→ See **External Modulation and Trigger Menu Pages** on page 42.

The "next" or "previous" program is constrained to the same bank as the currently loaded program. If the currently loaded program is the "highest" program in the bank, a "next" program trigger will load the <u>lowest</u> program in the bank. Similarly, if the currently loaded program is the "lowest" program in the bank, a "previous" program trigger will load the <u>highest</u> program in the bank.

Saving a Program

If you've tweaked a program or created your own program, you'll probably want to store it for future use. If you've tweaked a program and don't want to overwrite the original version, you should use the `<save>` **SOFT KEY** in the **PROGRAM** area. Similarly, if you've created your own program, there *is* no original version, and again you should use the `<save>` **SOFT KEY** in the **PROGRAM** area.
→ If you <u>do</u> want to overwrite the original version of a saved program, use the <update> SOFT KEY discussed below.

Pressing the `<save>` **SOFT KEY** results in the screen shown on the right. The second line of the display, "`bank`," allows you to select the bank in which you will save the program. If a Memory Card is in place, the banks on the Memory Card will be accessible as well. The third line, "`program number`," allows you to select which "slot" the program will be saved in. The available choices will be all those numbers between 0 and 127 that do not already have a stored program associated with them (so you can't accidentally overwrite a program with the `<save>` command). The fourth line, "`name`," allows you to name the program. Once you're satisfied with the bank, program number, and name, place the cursor over the "`save`" line and press the **SELECT** key to go ahead with the save. If you chicken out, simply place the cursor over "`cancel`" and press the **SELECT** key to abort.

Once you have saved the program, it will appear on the PROGRAM screen with a 'U' (for User) at the right-hand side of the screen to help you distinguish your saved programs from factory programs.
→ see **Entering or Changing Text** on page 17.

Copying Programs

To copy a program, simply load it and then `<save>` it where you would like the program copied to. You can copy a program from one place in internal memory to another, from one place on a Memory Card to another, from internal memory to a Memory Card, or from a Memory Card to internal memory.

Updating a Program

Updating is just like saving, except that updating overwrites the previous version of the program. Pressing the `<update>` SOFT KEY calls the "pop-up" menu shown to the right. You cannot change the bank or the program "slot" number. This makes sense because you are *necessarily* overwriting the stored version of the program. You do have the option of altering the name, however.

It's worth noting that you cannot update any of the factory presets! If you try, you'll get the message shown to the right. If you want to save a tweaked version of a factory preset, use the `<save>` SOFT KEY.
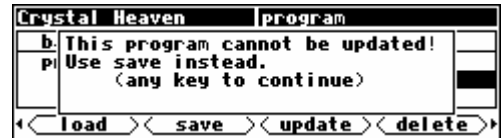
Renaming A Program

To rename a program, simply load it and then press the `<update>` SOFT KEY in the PROGRAM area. Before going ahead with the update, you are given the chance to rename the program. You can't rename the factory presets because you can't `<update>` them!

Deleting a Program

Because there is a finite amount of storage space in the DSP7000 or on a given Memory Card, you may want to delete some of your stored programs to free up "room" from time to time. To delete a program, go to the PROGRAM area and place the cursor over the program you would like to delete. The program you wish to delete does not need to be loaded.

On the screen to the right, if we were to press the `<delete>` SOFT KEY, we would be deleting the program "Delay_M C." (It doesn't matter that it's not currently loaded!)

Actually pressing the `<delete>` SOFT KEY would result in the screen to the right. Your only choices are to "delete" by placing the cursor over "delete" and pressing the SELECT key, or to abandon the operation by placing the cursor over "cancel" and pressing the SELECT key.

Factory presets are distinguished from your saved presets by the lack of a 'U' at the right-hand side of the screen. You can't delete any of the factory presets. Go ahead, try. . .

(Allowing Programs that are *Actually* Saved in Multiple Banks to *Appear* as Though They are Saved in the *Same* Bank.) Saving programs in an orderly fashion in a single bank can facilitate many tasks. One such task would be the loading of programs on stage. Who wants to go scrolling hither, thither, and yon, searching among hundreds of programs for the solo effect that has to happen **NOW**? In such a situation, you'd like to save all of the programs you'll use in the show in one bank in the order they'll be used. But, if all of the programs you'll use in the show are already saved elsewhere in the DSP7000, won't *re-saving* them to the "Live bank" waste a lot of precious storage space? Yes, Watson, it would, but we can circumvent that problem by *Linking* programs to the "Live bank."

A *link* requires a paltry 38 bytes of storage space (recall that the smallest of programs require around 1000 bytes !). In reality, the link tells the DSP7000 where the program of interest is *actually* saved, but as far as you're concerned, the link *is* the program of interest.

To link a program, first go to the PROGRAM area. Select the bank where you would like a link to show up. In our example, we'll place a link in the bank called "The Timeout Drawer."

```
Angelic Echos        program
  banks        45 The Timeout Drawer (0)
  programs  --- empty ---

◄  info  ◄  bank  ◄  link  ◄ compare ►
```

Press the <link> SOFT KEY to reveal the "pop-up" menu shown on the right. Find the program you want to link <u>to</u> with the second and third lines, "bank" and "program." Select the "slot" you would like the link to appear in with "program number." In our example, we're linking <u>to</u> the program "Band Phaser" that is

```
Ang ** Link a preset **
  b  bank:  25 Phasers
  p  program:  12 Band Phaser
     program number:  5
     □ <- cancel
     □ <- link
```

located in the "Phasers" bank. The link itself will be found in "slot" number 5 in the bank called "The Timeout Drawer." Place the cursor over "link" and press SELECT to confirm, or place the cursor over "cancel" and press SELECT to abort.

Unlike ordinary program names, an "L" follows a link name to let you know that it is, in fact, a link. You can delete a link just as you would delete an ordinary program, and doing so will have no effect on the "link<u>ed</u>" program. If you load a program through a

```
Angelic Echos        program
  banks        45 The Timeout Drawer (1)
  programs ► 5 Band Phaser           LU

◄  info  ◄  bank  ◄  link  ◄ compare ►
```

link and later chose to <update> that program, the *actual link<u>ed</u> program is updated*!

If a link is made to a program that is later deleted, the file name will no longer be shown. Instead, the phrase --NO LINK SOURCE-- is displayed. Additionally, if a link is made to a program on a Memory Card, the file name will not be shown while the card is removed. Instead, the phrase --NO LINK

```
Angelic Echos        program
  banks        45 The Timeout Drawer (2)
  programs    5 Band Phaser           LU
            ► 6 --NO LINK SOURCE--     LU

◄  load  ◄  save  ◄ update ◄ delete ►
```

SOURCE-- will again be displayed. Reinserting the Memory Card will restore the link. If you create a link in an internal memory bank to a program on a card and then happen to insert a *different card* that has a program in the same bank and slot number, the link on internal memory then will refer to the program on the different card. Since this is probably not your intention, we recommend either taking care to put links only on the card that contains the program to which they refer, or to use different bank numbers on different cards.
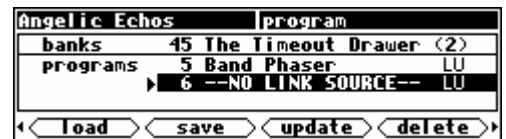
Comparing a Currently Loaded Program With The Original (Saved) Version
---

Are you a pathological tweaker? Yeah, I know the story, first you started tweaking only at large social gatherings - when the whole band was in the control room tweaking away. But then it became a little more serious: you started tweaking in the evenings after the band had gone home. Now you even tweak in the mornings! When confronted you say, "I just need to adjust the threshold *one more time.* Then I'll stop. I swear!" You're only kidding yourself...

To keep you honest, the DSP7000 comes with a "compare" feature. It allows you to compare your tweaks with the original, saved program. You can then determine if your tweaks are helping or, God forbid, hurting the situation.

Press the **PROGRAM** key a few times until you see the `<compare>` **SOFT KEY**. Then press it. Notice that the cursor does <u>not</u> need to be highlighting the program you wish to compare (i.e., the program that is loaded - `Angelic Echos`).

```
Angelic Echos          program
 banks        41 Vox (12)
 programs ▶ 10 B-vox Delays+verb
             11 B-vox Pitch+verb
             12 DualVoxProcess      ⸮
◄  info   ▷◁  bank   ▷◁  link   ▷◁ compare ▷▶
```

Once you've pressed the `<compare>` **SOFT KEY**, the DSP7000 will be running the original, saved version of the program. Notice that the upper left-hand side of the display reads "`ORIGINAL-PROGRAM.`"

```
ORIGINAL-PROGRAM       program
 banks        38 Shifters Unusual (23)
 programs      0 Angelic Echos      U
           ▶ 10 Angelic Echos
             11 Chim-Chiminee
◄  info   ▷◁  bank   ▷◁  link   ▷◁ compare ▷▶
```

To return to your tweaked version, simply press `<compare>` again. You may have noticed that the first time you compare, the DSP7000 displays the message: "`Any changes to original will be lost if not <save>d.`" This is a warning. You can, if the spirit moves you, make changes to parameters in the `ORIGINAL-PROGRAM`. However, when you press `<compare>` again to return to the tweaked version, those changes will be lost. If you want to avoid losing those changes, you must `<save>` the `ORIGINAL-PROGRAM` before pressing `<compare>` again. But the <u>Eventide Department of Sociology</u> suggests a better solution: *"Scientific studies reveal that the primary reason DSP7000 users feel compelled to change parameters on the* `ORIGINAL-PROGRAM` *is because their 'tweaked' version was heading down the wrong path. If you compare your tweaked version to the original and find that the original is better, simply reload the program before you resume your tweaking. That way, the* `<compare>` *function will still be open to you!"*   -EDS

PARAMETERS

"I can't tell you what a parameter is, but I'll know it when I see it."
-US Supreme Court

The PARAMETER area is special in that the menus change to reflect the options available in the currently running program. The number of menu pages and their content vary from program to program. Consequently, very little can be said about parameters generally. But that's not much of a liability; parameters are easy to understand as you encounter them.

```
Angelic Echos      delay params
level :     0 db   depth:    2.0 ms
delay1:   500 ms   rate :   0.01 hz
delay2:   500 ms   hicut:   3997 hz
fback :    80 %
   delay    pitch     verb      info
```

Many, but not all, of the programs in the DSP7000 support an "expert mode" feature. The `expert mode` parameter controlling this feature is found on the `misc` menu page in the SETUP area (you may have to press the SETUP key a few times to find it). A setting of `0` *hides* all but the most relevant menu pages in the

```
Angelic Echos      misc setup
key hold:   1.0 sec# favorites: 8
expert mode: 0
wordclock:  no
extra sync:  yes
   misc
```

PARAMETER area. Conversely, a setting of `9` *reveals* all of the available menu pages in the PARAMETER area. Settings between `0` and `9` reveal a proportionate amount of menu pages in the PARAMETER area.

Leave `expert mode` at `9` if you like lots of parameters to tinker with, at `0` if you find lots of parameters annoying, or somewhere in-between if your tastes fall somewhere in-between.

While most parameter types are self-explanatory, there are a few special types that deserve specific mention:

System Tempo

Most programs that have "frequency" or "time" parameters (e.g. LFO's, reverb decays, and delays) will synchronize to the system tempo. This greatly simplifies the task of customizing a program to a particular song. Simply set the system tempo to tempo of the song you're working on and BAM! Everything falls in place!

The system tempo is defined on the `tempo` menu page in the SETUP area. In the simplest case, set `Source` to `Internal` and manually enter the appropriate `Tempo`. Alternatively, you can tap the `<tap>` soft key to the beat and the DSP7000 will calculate the

```
B: FM Panner       Tempo
Beat
Tempo: 133 BPM
Source: Internal
Average: 2 Taps
   format    <tap>     timer    pedals
```

tempo for you. Change the number of taps used in this calculation with the `Average` parameter.

You can derive the system tempo from several other sources using the `Source` parameter:

- `Tip 1&2`   The voltage at the tip of pedal inputs 1 or 2 defines the system tempo.
- `Midiclock`   A midiclock signal sent from a sequencer to the DSP7000's MIDI input defines the system tempo.
- `ext1-8`   The value of external modulators 1 through 8 define the system tempo.
  → See page 50 for information regarding the external modulators.

Parameters in the PARAMETER area that synchronize to the system tempo are denoted by "t_" before their name, such as "t_length".

```
B: Demondelay      multitap params
mix     :   100 %  random   :     0 %
# taps  :    32    dlyshape: constant
t_length: 1/4 note ampshape: lin_inc
length  :   769 ms panshape: spread
   multitap   info
```

Notice that changing `t_length` (or any `t_` parameter) changes the corresponding `length` parameter to reflect the interaction between the musical duration (`1/8 note` in this case) and the system tempo (78 BPM in this case).

```
B: Demondelay      multitap params
mix     : 100 %    random  :     0 %
# taps  :  32      dlyshape: constant
t_length: 1/8 note ampshape: lin_inc
length  : 384 ms   panshape: spread
  multitap    info
```

You can also override the `t_` parameter by adjusting the "naked" parameter (`length` in this case). *However, if the system tempo is changed, the "naked" parameter will revert back to its calculated value!*

```
B: Demondelay      multitap params
mix     : 100 %    random  :     0 %
# taps  :  32      dlyshape: constant
t_length: 1/8 note ampshape: lin_inc
length  : 1000 ms  panshape: spread
  multitap    info
```

If you want to make the "naked" parameter impervious to changes in the system tempo, turn the `t_` parameter to `off`.

```
B: Demondelay      multitap params
mix     : 100 %    random  :     0 %
# taps  :  32      dlyshape: constant
t_length: off      ampshape: lin_inc
length  : 1000 ms  panshape: spread
  multitap    info
```

System Timer

Much like the system tempo, the system timer provides a common reference point for measure-based parameters such as loop times (note that the system timer is used in far fewer programs than the system tempo). Set the system timer using the `timer` soft key in the **SETUP** area.

```
A: MobiusManifold  Delay Timer
Time:    2.00 sec
Source:  soft key
Mode:    restart
 format   tempo    <run>   pedals
```

Let's say you want to use loops in a song with measures that are 2 seconds long (MeasureTime = BeatsPerMeasure * 60 / BPM). Using the nifty formula or some prior knowledge, you can simply set the `Time` parameter to `2.00 sec`. Alternatively, with `Source` set to `soft key` and `Mode` set to `restart`, you can tap the `<run>` softkey at the beginning and end of a measure and the DSP7000 will calculate the time for you.

Now load up a loop program such as "Reich Loops 2". The loop time is automatically set to the system timer (notice the lower right corner)! You can use the `timer equals` parameter to define how many bars the timer will equal. Not all loops are set up to work with the system timer - only those that explicitly show the system timer value.

```
A: Reich Loops 2   loop params
input:    -3 dB    timer equals: 1 bars
loop#:     1
loop :
timer:  2.000 sec
  loops    time     mix     info
```

Notice also that all of the programs that use the timer can be "overridden" by simply entering a new loop time value.

...Back to the `timer` menu page in the **SETUP** area. By setting `Source` to `tip 1` or `tip 2`, you can use a foot pedal in place of the soft key to calculate the length of a measure. Tap the foot pedal at the beginning of the measure and again at the end of a measure. By setting `Source` to `ext1`, `ext2`, ..., `ext8`, you can use any of the external modulators in a similar fashion.

```
A: MobiusManifold  Delay Timer
Time:    2.00 sec
Source:  tip 1
Mode:    restart
 format   tempo    <run>   pedals
```

By setting `Mode` to `continue`, successive "taps" of the `Source` (be it the soft key, a foot pedal, or whatever) will simply extend the current system timer without resetting it to zero.

```
A: Reich Loops 2   Delay Timer
Time:    5.17 sec
Source:  ext1
Mode:    continue
 format   tempo    <run>   pedals
```

Taps

Several programs use a tapped delay line. For a particular "tap," the UP and DOWN CURSOR keys select among three parameters:

- dly   adjusts the delay position of a particular tap (the number of milliseconds before the tap)
- lvl   adjusts the level of a particular tap
- pan   adjusts the stereo pan position of a particular tap

Use the LEFT and RIGHT CURSOR keys to select the particular tap for which you're adjusting parameters. The graphic to the right of the parameters represents the delay position and level of every tap in the bunch.

Textblocks

All right, maybe a "textblock" isn't really a *parameter*, but you'll find it hiding among parameters, so we might as well discuss it here. You'll typically find these creatures on an info menu page in the PARAMETER area. As the name suggests, this is just a block of text that you can read for your own enlightenment. If all of the text fits on the screen, that's the end of the story. If, however, all of the text *doesn't* fit on the screen, you'll see a double-headed arrow to the left of the text.
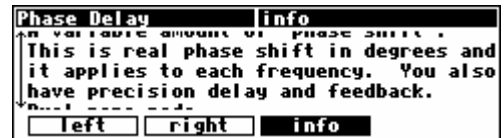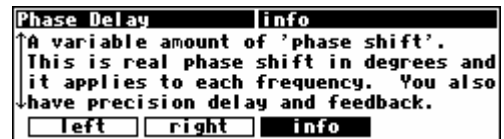
Turning the KNOB scrolls the text so you can read the rest.

Graphics and Curves

Several programs use an interface reminiscent of an analog graphic equalizer. Two parameters are used, an *x* value and a *y* value. The *x* value is the horizontal position of the currently selected graphical point, and the *y* value is the vertical position of the currently selected graphical point. In our example to the right, the *x* value is 12500 Hz, and the *y* value is 0.0 dB. With the cursor in the *y* field (as shown above), the LEFT and RIGHT CURSOR keys change the *x* value, while the KNOB and NUMERIC KEYPAD change the *y* value. With the cursor in the *x* field, the LEFT and RIGHT CURSOR keys, the KNOB, and the NUMERIC KEYPAD all change the *x* value. Use the UP and DOWN CURSOR keys to move between the graphic interface and other parameters on the screen.

For example, pressing the LEFT CURSOR key several times on the screen above would change the *x* value and result in the screen to the right.

Spinning the KNOB on the screen above would change the *y* value and result in the screen to the right.

Pressing the DOWN CURSOR key on the screen above would move the cursor from the graphic interface to the `mast` parameter.

STORING AND LOADING SETUPS

As you will have deduced from reading the foregoing text, there are many adjustments you can make to the DSP7000. Wouldn't it be nice if you could save them somewhere, both to get back to the same state at a later date, or to make another DSP7000 behave the same as yours? You can!

Access the Setup Storage area by *holding down* the **PROGRAM** key for one second. The LED next to the PROGRAM key will begin to blink and the upper right-hand portion of the screen will read "setup."

Here we find four SOFT KEYS which in general behave as they do in the PROGRAM area, except that there are only two "banks" (`Internal` and `Card`).

- `<load>` loads saved setup configurations
- `<save>` saves setup configurations *without* overwriting the last setup configuration that was loaded
- `<update>` saves setup configurations by overwriting the last setup configuration that was loaded
- `<delete>` deletes stored setup configurations from memory

→ See **Loading Programs** on page 57, **Saving a Program** on page 59, **Updating a Program** on page 60, and **Deleting a Program** on page 60 for more details.
→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 66.

There is one difference between `saving` a *setup* and `saving` a *program*. It is possible to choose whether, when the setup is reloaded, it will automatically load the programs that were loaded when it was saved. This brings the machine state as close as possible to that when it was saved. To do this, set `with programs` to `yes`.

A few things to be aware of:

- The programs are not saved as part of the setup, so they must still exist on the machine.
- After loading a setup, a small number of noncritical settings, such as screen brightness, will not be restored until the system is restarted.

MISCELLANEOUS SETUP OPTIONS

The `misc` menu page in the SETUP area contains a number of assorted setup options that are unrelated to the other pages.

`Key hold` is the time for which a key must be held down to trigger Key Hold functions, such as:

Setup Storage on page 11

`Expert mode` allows more or less information to be displayed on certain programs, as well has hiding some warning messages, depending on its setting. For more information, see page 22.

`extra sync` involves external synchronization and is discussed in "Selecting The External Clock" on page 36.

`# favorites` allows the user to control the number of "most recently used" programs shown as links in the "Favorites Bank." The default value of 8 is usually a good setting. If it is set to zero, none will be shown - this will make sure that nobody knows which programs you've been using….

`wheel speed` this controls how "quickly" the wheel changes parameters. High values result in quick changes; low values in slow changes. Customize your DSP7000...

APPENDIX A -UTILITIES

TRANSMITTING AND RECEIVING DATA

Setting Up the Serial Port

The serial port can be used to transmit data between the
DSP7000 and a computer or between the DSP7000 and another
DSP7000. It is an IBM PC type RS232 connector, which looks
like a modem or printer to a connected computer. You can set up

```
A: GuitarTuner      serial setup
serial: enabled     parity: none
baud rate: 115200
data bits: 8
stop bits: 2
┤   midi  ║external║   dump  ║nextprog├
```

the serial port's parameters on the "third" `midi` menu page in the SETUP area. Repeatedly press the `midi`
SOFT KEY until you see the menu page shown to the right.

The first parameter, `serial`, determines whether the serial port is `enabled` or `disabled`. If set to `dis-`
`abled`, messages will neither be sent out the serial port nor accepted at the serial port. The second parame-
ter, `baud rate,` determines the speed at which messages will be sent out the serial port *and* the speed at
which the DSP7000 expects to receive messages at the serial port. Similarly, `data bits`, `stop bits`, and
`parity` all describe aspects of the messages sent out the serial port *and* aspects of the messages that the
DSP7000 expects to receive at the serial port.

For things to work properly, these last four parameters must be set to the same values on both the DSP7000
and the machine connected to the serial port. Higher `baud rates` result in faster transmission times, but
most machines have a ceiling above which errors occur. So, set the `baud rate` to the highest value you can
on both the DSP7000 and the machine connected to its serial port that results in error-free transmissions.

The `data bits` are normally set at `8`, the `stop bits` are normally set at `2`, and the `parity` is normally set
at `none`. You should only need to stray from these values if the device the DSP7000 is communicating with
is constrained to some other values. If that is the case, change the values on the DSP7000 to match the
other device.

To aid in troubleshooting, the BUSY LED will illuminate when data is transferred at the serial port, pro-
vided no memory card is in place. *If the serial port is "enabled," messages sent out the MIDI Out port are also sent out the serial port.*
Note: If both the serial port is "enabled" and MIDI is "enabled," a command received over either the serial port or the MIDI In port causes the port
not *receiving the command to be ignored until the command is complete.*

The pin-out for the serial port is:
1 DCD
2 RXD   6 DSR
3 TXD   7 RTS
4 DTR   8 CTS
5 gnd   9 nc

For most applications, only pins 2,3, and 5 need be connected.

Dumping Data and Receiving Data Dumps

You can "dump" data from the DSP7000 for external storage or for use in another DSP7000. To dump, go to the dump menu page in the SETUP area. The dumped data will be system exclusive and will be sent out the MIDI Out port and the serial port. None of the MIDI parameters on the midi menu page in the SETUP area has any bearing on dumps except for the device ID. The device ID is used as part of the system exclusive messages in the dump. While the dump is occurring, a running display of the number of bytes sent is presented for those keeping score at home. You can reload the dumped information into the DSP7000 by presenting it at the MIDI In port or the serial port *(provided* system exclusive *is set to on and* MIDI *is set to* enabled *on the* [midi] *menu page in the* SETUP *area).* Let's look at the five "types" of dumps.

dump program — This function dumps the currently running program. If received at the MIDI In port or at the serial port, the DSP7000 will load the received program.

dump setup — This function dumps the state of the DSP7000, covering all of the parameters covered in the SETUP area.

dump files — This function dumps all *setups* and *programs* stored in internal memory. *Note: The factory presets are not dumped by this function.* If received at the MIDI In port or at the serial port, the DSP7000 will erase all of your saved setups and saved programs and replace them with the received setups and programs. *Note: The current setup and the currently running program will not be altered.*

dump card — This function dumps all setups and programs stored on the Memory Card. If received at the MIDI In port or at the serial port, the DSP7000 will erase your Memory Card and replace its contents with the received setups and programs. If there is no Memory Card in place or if the Memory Card is too small, the incoming data is ignored.

dump internal — This function dumps the contents of the internal memory. This is the same as using dump files, dump setup, and dump program. It dumps all the setups and programs stored in internal memory, along with the current setup and the current program. If received at the MIDI In port or at the serial port, the DSP7000 will replace all of its setups and programs, load the new program, stop all operations and start as if from power-up, using the new setup and programs.

If the device to which you sent the dump has the ability to send it back again (such as a sequencer), you can use this as a way to "back up" your DSP7000.

WARNING: If, for any reason, this dump gets corrupted in some way and you send it back to the DSP7000, you will lose all the information you are trying to back up, as well as the DSP7000's contents. If you do a "backup" in this way, especially to a computer, it would be a good idea to do it twice, to two separate files, and then to compare the files. If they are identical, it's a good indication that the data sent from the DSP7000 has been recorded accurately.

Controlling One DSP7000 from Another DSP7000

The DSP7000 can send system exclusive messages detailing all changes to its parameters, both effects-program specific and SETUP values. The DSP7000 is designed so that a sequencer can receive and then play back these values to the same DSP7000, but we can also use this feature to slave one DSP7000 to another.

To slave one DSP7000 to another:

```
Low Res Digital    global configure
MIDI:   enabled    system exclusive: on
serial: enabled    device ID:  1
program load:off
sequence out:  off
◄ audio   service    midi    mod con ►
```

- set the parameter `sequence out` found on the `midi` menu page in the **SETUP** area to `off` on the "slave."
- On the same menu page, set the parameter `sequence out` to `new` on the "master."
- On the same menu page, set the parameter `MIDI` to `enabled` on both units.
- On the same menu page, set `system exclusive` to `on` for both units.
- On the same menu page, set `device ID` to a common value for both units.
- Connect either the MIDI Out port of the "master" to the MIDI In port of the "slave" or connect their serial ports. (Using the serial ports will require a special *null modem* cable, with pin 2 of each end connected to pin 3 at the other, and vice versa.)

Now, changes made on the "master" are echoed on the "slave." Be sure to leave `sequence out` to `off` on the "slave" or MIDI "feedback" will lock up the DSP7000s in a very bad sort of way.

Sending A Program From One DSP7000 to Another

To send a program from one DSP7000 to another, turn `sequence out` to `off` on the `midi` menu page in the **SETUP** area on both DSP7000s. On the same menu page, change the `device ID` of each of the DSP7000s so that they agree. Then connect their serial ports or connect the MIDI Out port of the

```
Low Res Digital    global configure
MIDI:   enabled    system exclusive: on
serial: enabled    device ID:  1
program load:off
sequence out:  off
◄ audio   service    midi    mod con ►
```

"sender" to the MIDI In port of the "receiver." Make sure the program you would like to send is running on the "sender."

→ To read about using the serial ports, see **Setting Up the Serial Port** on page 68.

On the "sender," highlight `dump program` on the `dump` menu page in the **SETUP** area and press the **SELECT** key. The program will be loaded on the "receiver." Before doing anything else, you should change the `device ID` of one of the DSP7000s so that it

```
Low Res Digital    MIDI data dumps
□ ◄- dump program  □ ◄- dump internal
□ ◄- dump setup
□ ◄- dump files
□ ◄- dump card
◄ display   pedals    dump    nextprog ►
```

is no longer the same as the `device ID` of the other. Failure to do so *could* cause problems later if `sequence out` gets set to `on` on both the DSP7000s!

Sequencing With MIDI

Most MIDI sequencers will receive system exclusive messages and store them for later playback on the originating instrument. The DSP7000 fully supports this. Instead of sending keyboard presses and knob turns, the DSP7000 sends "parameter change messages." When a sequencer sends a "parameter change message" back to the DSP7000, the corresponding parameter is adjusted. This is true whether the display is showing the parameter or not. Further, you can operate the front panel of the DSP7000 as you normally would *while* it's receiving "parameter change messages" from a sequencer.

Newer versions the DSP7000 use a "new" ASCII-based sequencing protocol that is superior to the "old" protocol. When you turn sequencing on, you can select which of these protocols to use. Unless you're reading an old sequence or have to ensure compatibility with older machines, we suggest you use the "new" protocol.

To actually sequence, set `sequence out` (on the `midi` menu page in the **SETUP** area) to `new`. Every time a parameter is changed, a corresponding message is sent out the MIDI Out port and the serial port as a system exclusive message. By recording parameter changes to a MIDI sequencer, you can automate your mixdowns.

```
Timeout Spore        global configure
MIDI:   enabled      system exclusive: on
serial: enabled      device ID:   1
program load: on
sequence out:   new
◄   midi   ║external║   dump  ║nextprog║►
```

Simply play back the recorded MIDI sequence at the DSP7000's MIDI In, and you will see the changes you recorded "played" by the sequencer (*assuming* `MIDI is enabled, system exclusive is on`*, the program that was loaded when the sequence was recorded is loaded during playback, and the* `device ID` *set during recording is set during playback*). However, if you manage to configure the MIDI connections between your various pieces of equipment such that the "system exclusive, sequence out" MIDI messages of the DSP7000 loop back into the DSP7000 <u>without delay</u>, digital demons will unleash a raging fury inside your helpless DSP7000. So, make sure that doesn't happen! If you aren't actively using the `sequence out` feature, it's wise to leave it `off`. *By leaving* `sequence out on` *and* `system exclusive off` *while recording a sequence, and* `sequence out off` *and* `system exclusive on` *while playing the sequence back, you can eliminate the possibility of those digital demons dancing their mean dance in the DSP7000! However, doing this would render the "echo" feature discussed below useless.*

All adjustments made to the DSP7000 while the parameter `sequence out` is set to `on` are sent out the MIDI Out port and the serial port (not including Patch Editor commands). This includes any changes received at the MIDI In port. If the MIDI sequencer is sending data to the DSP7000 and receiving data from the DSP7000 *at the same time*, it will receive an "echo" of the commands it sends to the DSP7000. This means that if you change something on the DSP7000 while sequencing (and echoing), then your changes will also be sent with the echo information to the sequencer. This might be useful for editing or touching-up a sequence.

CONNECTING USER-SUPPLIED CRYSTALS AND EXTERNAL CLOCKS

External Clock

An external TTL level clock at 256 times the desired sample rate may be used as a synchronization source. It should be connected to J402 on the DSP7000's motherboard. This signal should have low jitter and well-controlled edges for proper operation. Its use is not recommended for sample rates above 50kHz.

Since this socket connects directly to the DSP7000's internals, incorrect usage may damage the DSP7000's circuitry and is NOT covered by the Warranty.

- **Pin Connections**

(1) Clock   (2) Gnd   (3) 5v at 100mA maximum

User-supplied Crystal Oscillators

A user-supplied crystal oscillator may be installed to give sample rates beyond those offered by the DSP7000, such as 32kHz or 44.056kHz. This oscillator should be installed in the socket at location Y401 on the DSP7000's motherboard. The oscillator should run at 256 times the desired sample rate and should be similar to the "Fox" 1100E type used elsewhere on the motherboard. (Fox Electronics, Florida, tel: 813 693 1554.)

Since this socket connects directly to the DSP7000's internals, incorrect usage may damage the DSP7000's circuitry and is NOT covered by the Warranty.

- **Pin Connections** (based on 14 pin DIP socket)

(1) no connection   (8) output

(7) Ground   (14) 5v at 100mA maximum

SERVICE AND START-UP OPTIONS

Fixing Internal Memory Problems

The DSP7000 uses solid-state memory circuits to store programs and setup information. These circuits use a long-life battery to keep them alive while the DSP7000 is turned off. Whenever the computer in the DSP7000 updates that memory, it performs an operation called a "checksum" and stores the result. A checksum is a calculation whose result characterizes what is stored in memory. A second run of the checksum calculation should result in the same characterization, *if the memory hasn't changed*. When the DSP7000 is turned on, it runs a checksum calculation on the memory and compares the result against the stored result. If there is a discrepancy, the DSP7000 reports an error.

In the unlikely event that an "internal memory checksum error" occurs, there may be a critical problem with what is stored in memory. The service function `fix internal` on the `service` menu page in the **SETUP** area will remove the checksum error by forcing the new checksum result to be saved. This will not get rid of the corruption in the data, however.

After pressing the **SELECT** key on the above menu page, you will arrive at the menu page shown to the right. If you want to go ahead with the procedure, press the `<yes>` **SOFT KEY**. Otherwise, press the `<no>` **SOFT KEY**.

Now, you can assume that the "checksum error" was no big deal, get a cup of coffee, and go back to work (not advised) OR you can assume something nasty is going on and take immediate action (advised). Assuming you take the latter (smart) course of action, the first thing you'll want to do is to save all of your important programs and setups to a card (see ***Copying Programs*** on page 59) or to an external storage device (see ***Dumping Data and Receiving Data Dumps*** on page 69).
Then return to the `service` menu page in the **SETUP** area.

Highlight `format internal` and press the **SELECT** key. You'll arrive at the screen shown to the right. Pressing the `<yes>` **SOFT KEY** will delete everything *you* have stored in the DSP7000, returning it to the state in which it left the factory. Pressing the `<no>` **SOFT KEY** will abort the mission.

Internal memory "checksum errors" should occur infrequently, if ever. Should they occur more frequently than "infrequently," contact Eventide, as something is definitely amiss.

Fixing Memory Card Problems

If a Memory Card "checksum error" occurs, your Memory Card has been corrupted in some way. It is possible that there is no loss of data. Memory Cards can be corrupted by static electricity, shock, a loose battery, older siblings, a weak battery, incorrect insertion into the DSP7000, use in some other computer, or myriad other causes. As a result, a Memory Card "checksum error" should not *immediately* send your heart into your mouth (although an internal checksum error probably should). Regardless of whether you are concerned about a Memory Card "checksum error" or not, you should "fix" the checksum.

Go to the ⌐service⌐ menu page in the SETUP area.

Highlight `fix card` and press the SELECT key. Press the <yes> SOFT KEY to force the new checksum result to be saved. If data is in fact corrupted, this will not fix it. Press the <no> SOFT KEY to abort.

If you are worried about the contents of the Memory Card, you should either dump the contents of the Memory Card to an external storage device (see ***Dumping Data and Receiving Data Dumps*** on page 69) OR copy all valuable <u>internal</u> programs and setups to a different Memory Card, copy the faulty Memory Card's programs and setups to <u>internal</u> memory and then to another Memory Card (see ***Copying Programs*** on page 59). Finally, return to the ⌐service⌐ menu page in the SETUP area.

Highlight `format card` and press the SELECT key. Pressing the <yes> SOFT KEY will erase the contents of the Memory Card and reformat it. Press the <no> SOFT KEY to abort.

You might also put a label on the card (using adhesive tape, indelible marker, etc.) indicating that a problem occurred along with the date. Keep track of this kind of problem and make multiple backup copies. Have you been introduced to Mr. Murphy? He's got this law that says. . .

Changing the Internal Battery

A small button-type battery is mounted internally and powers the DSP7000's memory when the power is off. This should last about five years before it needs to be changed, longer if the DSP7000 is left powered up much of the time. The number of hours for which the unit has been operating, powered and unpowered, can be found under SETUP/service/information.

This battery should be replaced by a **qualified technician only** since it must be replaced when the DSP7000 is powered up in order to preserve the internal memory contents. Contact your Eventide Service Center to have this battery replaced.

IMPORTANT SAFETY NOTICE FOR LITHIUM BATTERY:
❑ Danger of explosion if battery is incorrectly replaced.
❑ Replace only with same or equivalent type recommended by manufacturer.
❑ Dispose of battery according to manufacturer's instructions.

Clear Setup

At the factory, all of the adjustable parameters in the DSP7000 are set to nominal values called "factory defaults." To return these parameters to their "factory defaults," go to the `service` menu page in the SETUP area. Highlight `clear setup` and press the SELECT key. Pressing the <yes> SOFT KEY will replace current parameter values with the "factory defaults." *Unless you saved your setup before pressing <yes>, it will disintegrate into digital dust (see **Storing and Loading Setups** on page 66).* Press the <no> SOFT KEY to abort. The parameters affected include:

• everything in the LEVELS area.
• everything in the SETUP area.

If the DSP7000 ever gets "buggy," try using `clear setup` before you do anything more "drastic." It is usually wise to perform a `clear setup` after installing a new version of software.

Alternatively, you can clear the internal setup by holding down the SETUP key during start-up.

Software Version and Accessories

The DSP7000 has expansion and upgrade capabilities. "Information" menu pages allow you to keep track of what options are inside your DSP7000 without having to open the box. To access the "information" menu pages, go to the `service` menu page in the SETUP area.

Highlight `information` and press the SELECT key to get a screen that looks something like the screen to the right.
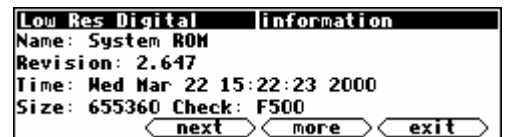
The <more> SOFT KEY reveals additional information pertaining to the current page. The <less> SOFT KEY returns from the additional information.
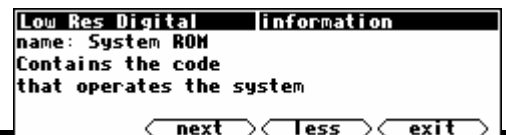
The `<next>` SOFT KEY advances to the next menu page, `<last>` returns to the previous menu page, and `<exit>` returns to the `service` menu page in the SETUP area.

```
Low Res Digital      information
Name: memory card
No card present


  last      next            exit
```

One important piece of information to be found in this area is your DSP7000's *Electronic Serial Number,* which is the first 8 digits of the `Hardware ID` number on the screen to the right. You may be asked for this by a dealer or an Eventide representative. The `Time/Date` figures are not currently used, so their values are

```
Low Res Digital      information
** Motherboard Info ***
Hardware ID: 7377120600000039D
Time/Date:   12:27:03 08/13/1970
Hours total/power 5387/423
  last      next            exit
```

unimportant. The `Hours total/power` refer to the total number of hours that have elapsed since the unit was built (`5387` in this case) and the total number of hours the unit has been powered (`423` in this case). A brand new unit may show as many as 300 powered-up hours to cover burn-in and factory testing.

Start-Up Options

There are several "secret keys" that can be depressed during startup to perform special functions. These keys should be pressed <u>and held down</u> during the second "start-up screen" - the one with the "DSP7000" in large text. You can release the key once the appropriate "special screen" appears.

Special Key	*Function*	
-	Erase the Memory Card. Press the `<Yes>` SOFT KEY to go ahead or `<No>` to abort.	```Do you really want to clear all the information stored on memory card? !!! This includes pre-recorded cards !!! < Yes > < No >```
CXL	Bypass start self tests. The DSP7000 will skip from "Powering On..." directly to "Initializing." When the "Initializing..." message appears, you can let go of the CXL key. This facility is a timesaver to allow the DSP7000 to power up more quickly.	
5	Run factory self test programs (**do not play with these, as some can erase internal setup and programs !!!**). See separately available service manual for more details on these tests.	```Hit SELECT to start Test All P=0 E=0 T=0```
8	Clear internal programs and setup. This key does the same thing as `format internal` on the `service` menu page in the SETUP area.	```Do you really want to lose all the stored information ? < Yes > < No >```
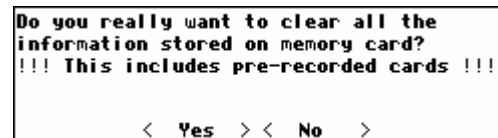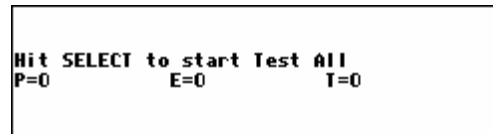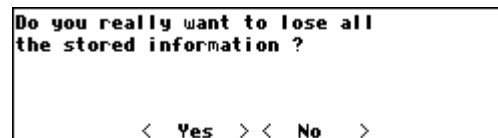
The purpose of this special key is to initialize the unit at the factory, or to fix a memory problem that might prevent the unit from working correctly. Press the `<Yes>` SOFT KEY to go ahead or `<No>` to abort. The need for this operation should be quite rare. If problems arise that require its use more that once, the factory should be contacted.

PROGRAM   Loads "`Mute`" instead of the current
                 program. Press the `<Yes>` SOFT
                 KEY to go ahead or `<No>` to abort.
                 This function is used in the rare
                 event that the last-run program
                 caused the unit to lock up.

```
Do you want to lose the current
program and load MUTE?



         <  Yes  > <  No   >
```

SETUP   Clears the internal setup and resets parameters in BYPASS, SETUP, and LEVELS to
                 their factory default values. This is an excellent first step if your DSP7000 starts act-
                 ing funny (but you don't know why, 'scuse me while I...). Alternatively, you can use
                 the `service` menu page in the SETUP area to clear the setup.

ELECTRICAL SPECIFICATIONS

Sample Rates

96kHz, 88.2kHz, 48kHz, 44.1kHz or external.

Frequency Response

Sample Rate	44.1kHz	48kHz	88.2kHz	96kHz
+0/-0.1dB	20Hz-20Khz	20Hz-22kHz	20Hz-41kHz	20Hz-44kHz
+0/-3.0dB	5Hz-21Khz	5Hz-23kHz	5Hz-42kHz	5Hz-46kHz

Digital Inputs/Outputs

Stereo AES and S/P DIF at 44.1-96kHz. AES relay bypass at power down.

Analog Input (XLR Balanced Inputs)

Impedance	20kOhm, bridging
Full Scale Input Level	26dBu
Dynamic Range	>105dB
Signal to Noise Ratio	>105dB, A-weighted
THD+N	<0.0025% @ 1Khz, -3dBFS
Crosstalk	<-100db @ 20 Hz to 20kHz, -1dBFS

Analog Output

Impedance	<50Ohm
Full Scale Output Level	26dBu
Dynamic Range	>105dB
Signal to Noise Ratio	>105dB, A-weighted
THD+N	<0.0025% @ 1Khz, -3dBFS
Crosstalk	<-100db, 20 Hz to 20kHz, -1dBFS

Remote Control Inputs

Up to 2 foot pedals (or 0-5V control inputs), or 6 footswitches, or combination.

Remote Control Outputs

2 isolated relay closures, rated at 1A 30VDC.

MIDI Connections

5 pin DIN output and thru.
7 pin DIN input with output capability.

Memory Card Interface

68 pin PCMCIA 2.0/JEIDA 4.0. Supports type 1 and 2 SRAM cards up to 4MB for data storage.

Factory Preset Capabilities (at 48k sampling)

Pitch shifting: up to 4 voices
Compressor/limiter: up to 4 instances
Equalization: up to 128 bands parametric single input, 64 bands at 2 channels
Sampling with time compression: up to 174 seconds mono (DSP7500 only)
Digital delay: up to 87 seconds mono (in addition to any installed sampler)

Power

100 watts 100-125V, 220-240V, AC 50/60Hz

Size

Inches: 3.5h x 19w x 12.5d
Cm: 8.9h x 48.3w x 31.7d

Weight:

12 pounds (5.5 Kg) net
17 pounds (8Kg) shipping weight

All specifications are subject to change or improvement at any time without notice or obligation.

WARRANTY INFORMATION

DSP7000 and DSP7500

<u>LIMITED WARRANTY</u>

The above-identified Eventide unit covered by this warranty is built to exacting quality standards and should give years of trouble-free service. If you are experiencing problems which are not cleared up or explained as normal in the manual, your recourse is this warranty.

<u>What the warranty does and does not cover</u>

Eventide Inc. warrants the above-identified unit to be free from defects in workmanship and material under normal operation and service for a period of one year from the date of purchase, as detailed below. At our discretion within the warranty period, we may elect to repair or replace the defective unit. This means that if the unit fails under normal operation because of such defect, we will repair the defective unit at no charge for parts or labor. We also assume a limited responsibility for shipping charges, as detailed below.

The warranty does not extend beyond repair or replacement as stated herein and in no event will we be responsible for consequential or incidental damages caused by any defect, and such damages are specifically excluded from this warranty. Our sole obligation is to repair or replace the defective unit as described herein.

The warranty DOES NOT COVER any damage to the unit regardless of the cause of that damage. The unit is a complex piece of equipment that does not react well to being dropped, bounced, crushed, soaked or exposed to excessively high temperatures, voltages, electrostatic or electromagnetic fields. If the unit is damaged for these or similar causes, and the unit is deemed to be economically repairable, we will repair it and charge our normal rates.

The warranty DOES NOT COVER shipping damage, either to or from Eventide. If you receive a new unit from us in damaged condition, notify us and the carrier; we will arrange to file an insurance claim and either repair or exchange the unit.

If you receive a new unit from a dealer in damaged condition, notify the dealer and the carrier.

If we receive the unit from you with apparent shipping damage, we will notify you and the carrier. In this case, you must arrange to collect on any insurance held by you or your carrier. We will await your instructions as to how to proceed with the unit, but we will charge you for all repairs on damaged units.

<u>Who is covered under the warranty</u>

The warranty applies to the original purchaser of a new unit from Eventide or an Authorized Eventide Dealer. Demo units are also covered by this warranty under slightly different circumstances (see below). Units that are used, or have been used as part of a rental program, are not covered under any circumstances.

It is your responsibility to prove or to be able to prove that you have purchased the unit under circumstances which effect the warranty. A copy of your purchase invoice is normally necessary and sufficient for this.

If you have any questions about who is an Authorized Eventide Dealer, call us.

Units with the serial number plate defaced or removed will not be serviced or covered by this warranty.

<u>When the warranty becomes effective</u>

The one-year warranty period begins on the day the unit is purchased from an Authorized Eventide Dealer or, if the unit is drop-shipped from Eventide, on the day shipped, plus a reasonable allowance for shipping delays. This applies whether or not you return your warranty registration form.

When we receive a unit, this is how we determine whether it is under warranty:
1. If the unit was shipped from our factory within the past calendar year, we assume that it is under warranty unless there is evidence to the contrary, such as its having been sold as used or rented, etc..
2. If the unit was shipped from our factory more than a calendar year ago, we assume it is not under warranty unless:
    a) There is a warranty registration form on file showing that it has been purchased within the past year under appropriate conditions.
    b) You send a copy of your purchase invoice indicating warranty status along with the unit.
3. If the unit was used as a demo, the warranty runs from the date that it was received by the dealer. The original purchaser gets the unexpired portion of that warranty.

When you send a unit for repair, you should indicate whether or not you believe it to be under warranty. If you do not say the unit is under warranty, we will charge you for the repair and we will not refund unless the charge was caused by an error on our part. If you believe the unit to be under warranty and you do say it is but we disagree, you will not incur any charges until the dispute is resolved.

Reading the above, you can see that it is to your advantage to send in the warranty registration form when you purchase the unit. If we know who you are, we can send you updates and notifications, and advise you of our new products. It will also enable you to receive pre-shipment of certain parts.

(c) 1999, 2000 Eventide Inc.

Who performs warranty work

The only company authorized to perform work under this warranty is Eventide Inc., Little Ferry, New Jersey. While you are free to give personal authorization to anyone else (or to work on it yourself), we will not honor claims for payment for parts or labor from you or from third parties.

However, we and our dealers do try to be helpful in various ways:
      1. Our dealers will assist, usually without charge during the warranty period, in:
            a) determining whether there is a problem requiring return to the factory, and
            b) alleviating user error or interconnection problems that may be preventing the unit from operating to its full capability.
      2. We are available for telephone consultation if the dealer is unable to assist.
      3. If a part is found to be defective during the warranty period and you wish to replace it yourself, we will normally ship the part immediately at no charge, provided your warranty registration form is on file. We reserve the right to request that the defective part be returned to us.

Shipping within the 50 United States

You are responsible for getting the unit to our door at no cost to us. We cannot accept collect or COD shipments.

We will return the unit to you prepaid, at our expense, using an expeditious shipping method, normally United Parcel Service. In areas not served by UPS we will ship by US Mail.

If you are in a hurry and want us to use a premium shipping method (such as air express, next day air, etc.), be sure you tell us and agree to pay shipping charges collect. If you specify a method that does not permit collect or COD charges, remit sufficient funds to prepay shipping.

Shipping outside the 50 United States

If you purchased the unit from a dealer in your country, consult with the dealer before returning the unit.

If you wish to return the unit to us, please note the following:
      1. The unit must be prepaid to our door. This means that you are responsible for all shipping charges, including customs brokerage and duties. When a unit is shipped to us it must be cleared through United States Customs by an authorized broker. You must make arrangements for this to be done. Normally, your freight forwarder has a branch in the United States which can handle this transaction. We can arrange to clear incoming shipments for you. If you want our assistance, you must notify us before shipping the unit for repair, giving full details of the shipment, and including a minimum of $250.00 in US funds to cover the administrative and brokerage expenses. Any balance will be applied to the repair charges or refunded. If a balance is due to us, we will request a further prepayment.
      2. All shipments will be returned to you collect. If this is impossible because of shipping regulations or money is due us, we will request prepayment from you for the appropriate amount.
      3. All funds must be in $US. Payment may be made by check drawn on any bank in the US, or by telegraphic funds transfer to our bank. If you send US currency, be sure that it is sent by a method you can trace, such as registered mail. If you wish to pay by Letter of Credit, be sure that it affords sufficient time for work to be performed and the L/C negotiated, and that it is free from restrictive conditions and documentation requirements.
      4. We reserve the right to substitute freight carriers. Although we will attempt to honor your request for a specific carrier, it is frequently necessary to select a substitute because of difficulties in communication or scheduling.

This warranty gives you specific legal rights and you may also have other rights which vary from location to location.

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