



*Orville*TM

Operating Manual

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

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 Orville. After these preliminaries are out of the way, you'll start using Orville and learning the basic methodologies that you will employ whenever you use Orville.

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 Orville in front of you, following the examples. After you finish the *Quickstart* guide, we'd have you play with Orville for a while. Once the initial "new box euphoria" wears off a bit, we'd have you sit down and read the *Operation* chapter. A true appreciation and mastery of Orville 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 Orville 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.

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OVERVIEW AND QUICKSTART

THE BIG PICTURE

The Eventide Orville is a programmable, multichannel, multipurpose, dual digital signal processor (DSP), 24 bit digital audio signal processor with UltraShifter™ capability. That's a lot of adjectives! It is the successor 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.

Orville is loaded with features that put it in a class by itself. It has four analog inputs, four analog outputs, four digital inputs, and four digital outputs that can all be used *simultaneously*. Routing among them is completely flexible ("anything to anything")! What's more, Orville houses two independent signal processors, each having four inputs and four outputs (imaginatively dubbed "DSP A" and "DSP B"). The two processors can be run in parallel, in series, or in any mutant variation thereof.

The variety and depth of the programs that run on the DSPs 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 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, DSP A boasts nearly three minutes of sample time *in addition* to the 40 seconds of delay time found on both DSP A and DSP B!

And for the user who is interested in making his or her *own* programs (if the huge number of factory programs aren't enough!), Orville 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. . .

As you read this manual, it may be easy to "lose sight of the forest for the trees." Always bear in mind the following:

- Orville houses two independently running DSPs (digital signal processors). They are lovingly referred to as "DSP A" and "DSP B." Although they are both always *running*, you can only *view* the parameters for one DSP at a time. Use the **DSP A/B** key to toggle the display between the two DSPs.
- Each DSP runs "programs" that are stored in the system. "Programs" are the algorithms that manipulate your audio. With the exception of "large sampler programs" and some "long delay" programs, any program can be run on *either* DSP. Like two separate effects boxes, the parameters for the program running on DSP A are totally independent of the parameters for the program running on DSP B. Like two separate effects boxes, you can connect the outputs of one DSP to the inputs of the other, or use them completely independently.
- Orville has four analog inputs, four analog outputs, four digital inputs, and four digital outputs that can all be used *simultaneously*. DSP A has four inputs and four outputs, and DSP B has four inputs and four outputs. Any input can be connected to any output. It's that simple (conceptually)!

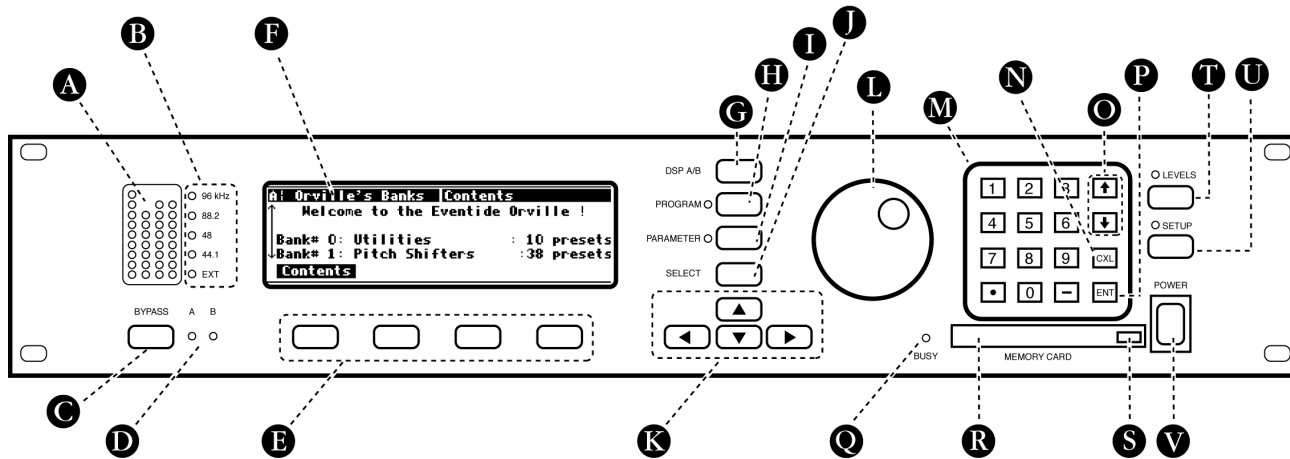
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Never lose sight of the above facts!!! They are the foundation upon which we will build our understanding!!!

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KNOBS, KEYS, AND JACKS

If this is your first time learning Orville, 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 Orville 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 four signals at the analog inputs, the digital inputs, DSP A in, DSP B in, DSP A out, DSP B out, analog out, and digital out. 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 Levels Meters** on page 51.

B) System sampling rate and external sync indicator.

The top four LEDs display the system sampling rate of Orville: 96 kHz, 88.2 kHz, 48 kHz, or 44.1 kHz. When solidly lit, they indicate that the system sampling rate is exact ($\pm 0.05\%$). 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.

→ See **Understanding The "System Sampling Rate And External Sync Indicator" When Using The Internal Clock** on page 59.

→ See **Understanding The "System Sampling Rate And External Sync Indicator" When Using The External Clock** on page 61.

C) BYPASS

Press this key briefly to access bypass menu options. Press and hold this key for one second to actually bypass the system (*the "system" is Orville as a whole*).

→ See **Bypassing and Muting** on page 64.

→ 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).

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D) Bypass Status LEDs:

- A illuminated = DSP A is bypassed
- B illuminated = DSP B is bypassed
- both A and B blinking = system is bypassed
→ See **Bypassing and Muting** on page 64.

E) 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 18.

F) The display

The display tells you what's going on. In the upper left-hand corner of the display is the letter "A" or "B." "A" indicates that what is shown on the display reflects the status of DSP A. Similarly, "B" indicates that what is shown on the display reflects the status of DSP B. *(The menu pages in the **BYPASS**, **LEVELS**, and **SETUP** areas have some displays that are common to both DSPs. In these areas, the "A" or "B" is irrelevant. However, in the **PROGRAM**, **PARAMETER**, and Patch Editor areas, menu pages are DSP specific.)* The remainder of the top line displays the program name running on the currently displayed DSP and the current 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 18.

G) DSP A/B

Press this key to toggle the display between the status of DSP A and DSP B. The upper left-hand corner of the display changes when you press this key; the "A" toggles to "B" and vice versa. *Both DSPs are always running, but the display only shows the parameters pertaining to one of them at a time.*

H) PROGRAM

Press this key briefly to access program functions such as loading, saving, deleting, etc. The DSP you are loading into or saving from is referred to in the left-hand corner of the display ("A" or "B"). To load into or save from the other DSP, press the DSP A/B key.

→ See **Program Load, Save, Delete, Etc.** on page 79.

Press and hold this key for one second to access the Routing Storage area where "routing configurations" are loaded and saved.

→ See **Storing and Loading Routing Configurations** on page 40.

Press and hold this key again for one more second to access the Setup Storage area where "setup configurations" are loaded and saved.

→ See **Storing and Loading Setups** on page 92.

→ To change the "one second hold time" required to enter the Routing Storage area, 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).

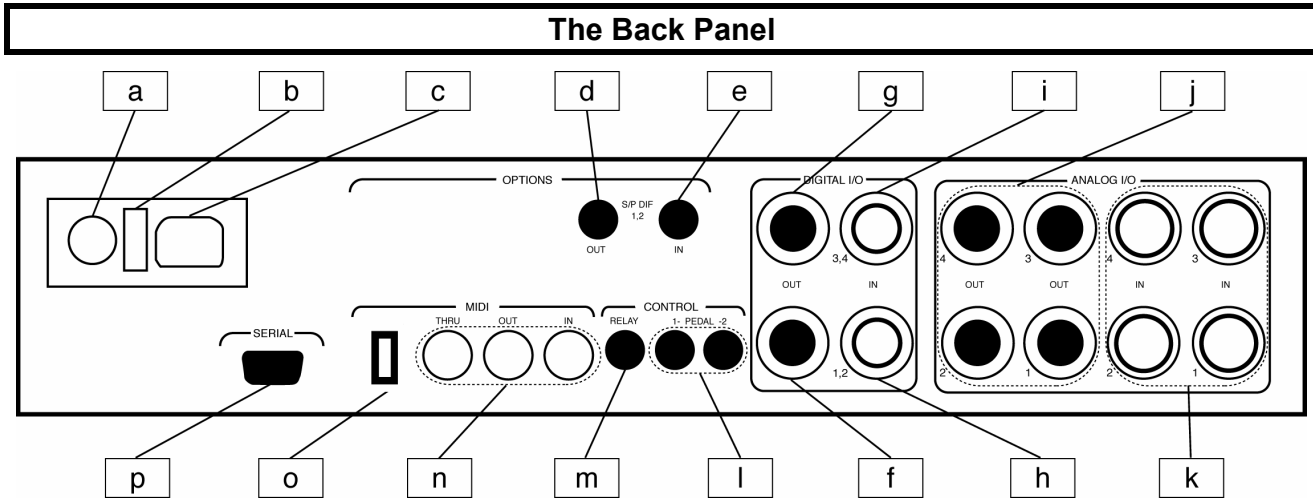
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- I) PARAMETER** Press this key briefly to access parameters for the programs that are running. The parameters shown are for the program running on the DSP referred to in the left-hand corner of the display (“A” or “B”). To see the parameters for the program running on the other DSP, press the **DSP A/B** key.
- Press and hold the **PARAMETER** key for one second to access the Patch Editor. The patch shown is for the program running on the DSP referred to in the left-hand corner of the display (“A” or “B”).
- See the separate Programmer's Manual for Patch Editor information.
 - To change the “one second hold time” required to enter the Patch Editor, 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).
- 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 83.
 - 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) CURSOR keys** Press these keys to move the cursor on the display. The **RIGHT CURSOR** key moves the cursor right, the **LEFT CURSOR** key moves the cursor left, the **UP CURSOR** key moves the cursor up, and the **DOWN CURSOR** key moves the cursor down. (We only break from this convention in the case of banks, where the **LEFT** and **RIGHT CURSOR** keys scroll through banks.)
- See **Using the Cursor Keys, the SELECT key, the NUMERIC KEYPAD, and the KNOB** on page 20.
- L) 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 20.
- M) The NUMERIC KEYPAD** Use the numbers, decimal point, and minus sign to enter numeric values or to enter numeric text in a text field.
- See **Using the Cursor Keys, the SELECT key, the NUMERIC KEYPAD, and the KNOB** on page 20.
- N) CXL** “Cancels” the last entered digit. It’s like the backspace key on a computer.
- O) INC/DEC keys** Use these keys to increment or decrement a parameter’s value.
- See **Using the Cursor Keys, the SELECT key, the NUMERIC KEYPAD, and the KNOB** on page 20.
- P) ENT** After you’ve entered a numeric value with the **NUMERIC KEYPAD**, press **ENT** to enter it.

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- Q) 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 Orville and the rest of the world.
- R) Memory Card slot** Insert a Memory Card here to add new programs or to save your own.
→ See **Memory Cards** on page 36.
- S) Memory Card release** Press this key to release the Memory Card (but don't press it if the **BUSY LED** is lit!).
- T) LEVELS** Pressing this key accesses menus for metering and levels.
→ See **Controlling Levels** on page 51.
- U) SETUP** Pressing this key accesses menus for routing, digital configuration, MIDI configuration, service utilities, data dump utilities, and program advance options.
- V) POWER** Flip this switch to bring Orville 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.

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 Orville 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.

d) S/P DIF 1/2 output jack

The digital outputs 1/2 are sent out this jack. Connect this output to the S/P DIF input on another piece of gear. If the

DOUT 1/2 parameter on the "bottom" **format** menu page in the **SETUP** area is set to S/P DIF, both digital outputs 1/2 (S/P DIF *and* AES/EBU 1/2) will be in the "consumer" format. If it's set to AES/EBU, both digital outputs 1/2 will be in the "professional" format.



e) S/P DIF 1/2 input jack

To select the S/P DIF digital input, set DIN 1/2 on the **inputs** menu page in the **SETUP** area to S/P DIF.



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→ See **S/P DIF** on page 56.

AES/EBU Digital Audio Input/Output (Professional)

Use these connectors to connect professional digital audio gear to Orville. These cables are differential 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 1/2 output jack

The digital outputs 1/2 are sent out this jack. Connect this output to the AES/EBU input on another piece of gear. If the DOUT 1/2 parameter on the "bottom" **format** menu page in the **SETUP** area is set to AES/EBU, both digital outputs 1/2 (S/P DIF *and* AES/EBU 1/2) will be in the "professional" format. If it's set to S/P DIF, both digital outputs 1/2 will be in the "consumer" format.

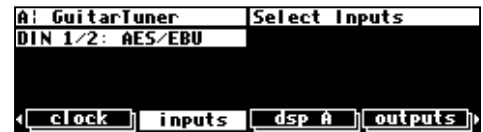


g) AES/EBU 3/4 output jack

The digital outputs 3/4 are sent out this jack. Connect this output to the AES/EBU input on another piece of gear.

h) AES/EBU 1/2 input jack

If the parameter DIN 1/2 on the **inputs** menu page in the **SETUP** area is set to AES/EBU, then digital inputs 1/2 are accepted at this jack. Connect the AES/EBU output of another piece of gear to this jack.



i) AES/EBU 3/4 input jack

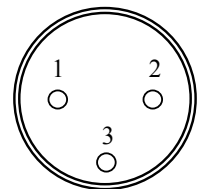
The digital inputs 3/4 are accepted at this jack. Connect the AES/EBU output of another piece of gear to this jack.

→ See **Digital Setup** on page 56.

j) Analog Audio Outputs

Orville'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!***



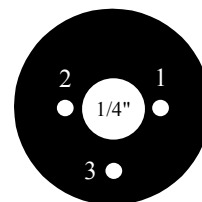
The analog outputs 1, 2, 3, and 4 send out signals on their corresponding jacks. Connect these outputs to the analog inputs of other gear.

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k) Analog Audio Inputs

Orville's analog inputs accept either unbalanced 1/4" connectors or balanced XLR connectors. Orville'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!***



The analog inputs 1, 2, 3, and 4 accept signals at their corresponding jacks. Connect the analog outputs of other gear to these jacks. These may be used as both line and guitar inputs, depending on the input level setting.

→ See **Controlling the Level of the Analog and Digital Inputs** on page 53.

l) 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 trigger events (including remote program loads).

→ See **Foot Pedals 1 and 2** on page 66.

m) Relay Jack

Two relays are connected to this Stereo 1/4" connector. They can be controlled from suitable programs, allowing Orville 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 Orville. See the separate Programming Manual for information on controlling the relays.

n) MIDI

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

- **In** - Orville accepts (and processes) MIDI messages received at the MIDI In port. The connector is "7 pin" and can provide power to a suitable pedal board, provided you supply power at the "Remote Power In" socket described below. It can also send MIDI messages from this connector to a suitably equipped system. This means, for example, that a pedal board can be connected to Orville by means of a single cable that supplies power as well as a communication path. A normal "5 pin" MIDI cable can be used as a standard MIDI input.
- **Out** - Orville sends MIDI messages to other devices via the Out port. *MIDI messages are also sent out the serial port if they are "enabled."*
- **Thru** - Any MIDI information received at the MIDI In port is echoed directly to the MIDI Thru port regardless of Orville's configuration (*as long as Orville 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.

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→ See **MIDI Setup** on page 67.

o) EveNet ethernet Ethernet jack for use with EveNet proprietary protocol. Visit www.eventide.com for more information.

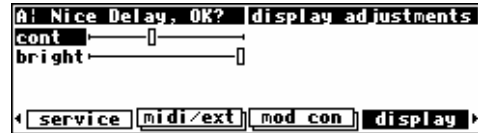
p) Serial Port An IBM PC type RS232 connector that looks like a modem or printer to a connected computer. Connect a "9 pin" serial cable to this port to transfer information to and from a personal computer (do not use the "null modem" type of cable designed for file transfer between two computers - it 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.*
→ See **Setting Up the Serial Port** on page 94.

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GETTING AROUND AND ALTERING PARAMETERS

Adjusting the Brightness and Contrast of the Display

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



The "Areas" of Orville

Orville'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 illuminates (except for the BYPASS area, but that one's obvious). 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).

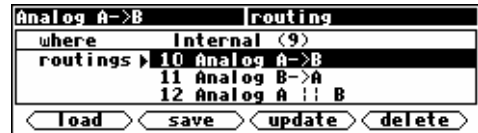


Press the PROGRAM key to access additional SOFT KEYS.

→ See *Program Load, Save, Delete, Etc.* on page 79.

ROUTING Storage

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



→ See *Storing and Loading Routing Configurations* on page 40.

→ To change the "hold time," see *Miscellaneous Setup Options* on page 92.

SETUP Storage

Press and hold down the PROGRAM key again 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 "routing configurations."



→ See *Storing and Loading Setups* on page 92.

→ To change the "hold time," see *Miscellaneous Setup Options* on page 92.

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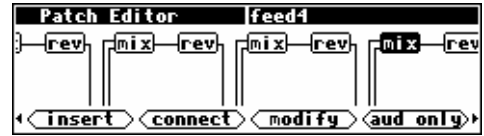
PARAMETER

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 88.



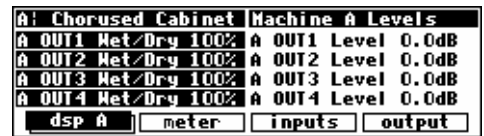
The PARAMETER key also gives access to the built-in Patch Editor. Press and hold down the PARAMETER key for one second to access this area. The LED next to the PARAMETER key blinks. The Patch Editor allows you to create your own effects from scratch or to customize programs that already exist.

→ See the separate Programmer's Manual for more information on the Patch Editor.
 → To change the "hold time," see *Miscellaneous Setup Options* on page 92.



LEVELS

Press the LEVELS key to access this area. Inside you'll find level and Level Meter parameters. → See *Controlling Levels* on page 51.



SETUP

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



BYPASS

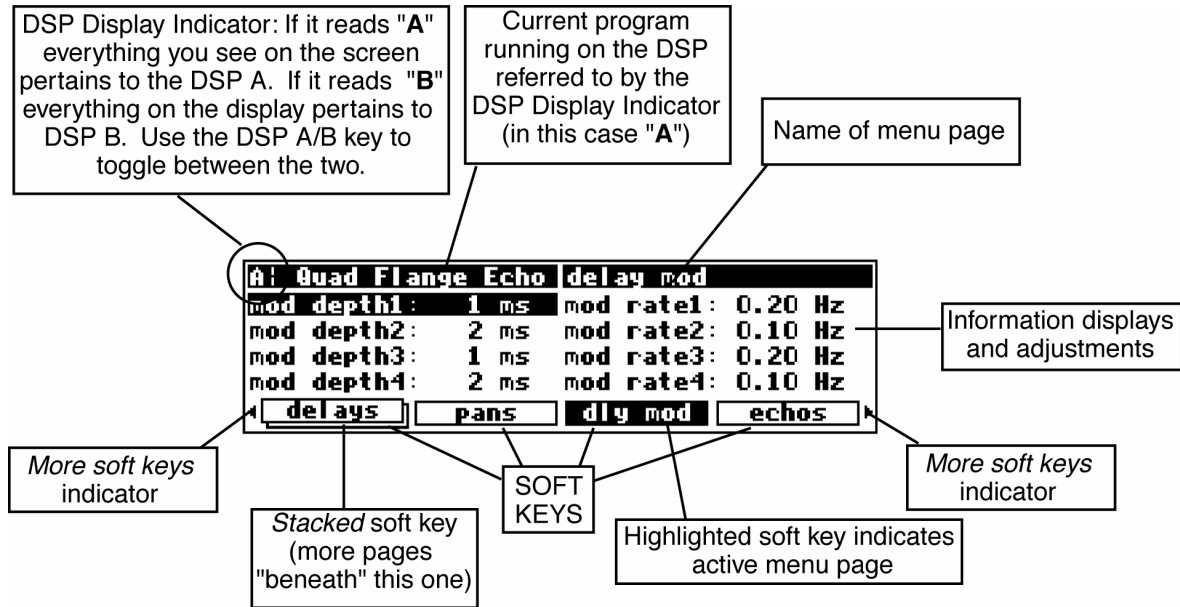
Press SYSTEM BYPASS to access this area. Inside you'll find the bypass options and the SOFT KEYS used to actually bypass or "un"-bypass. → See *Bypassing and Muting* on page 64.



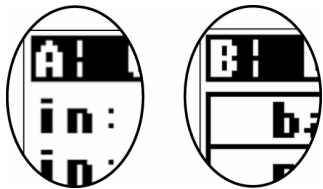
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Understanding the Display and SOFT KEYS

Every “area” in Orville 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 dis-



play that remain constant no matter what area of Orville you're in.



First, in the upper left-hand corner of the display is either the letter “A” or the letter “B.” This is the “DSP Display Indicator.” If it reads “A,” then everything else on a “DSP sensitive” screen is in reference to DSP A. If it reads “B,” then everything else on a “DSP sensitive” display is in reference to DSP B. Press the DSP A/B key to toggle the display between the two DSPs. *The screens in the PROGRAM, PARAMETER, and Patch Editor are “DSP sensitive.” Both DSPs are always running, but the*

display only shows the parameters for one of them at a time. The “DSP Display Indicator” lets you know which one you’re fiddling with. Look to it often.

The remainder of the upper left-hand corner of the display always shows the name of the program currently running on the DSP referred to by the “DSP Display Indicator.” In the example shown above, we’re running a program “Quad Flange Echo” on DSP A. 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 “delay mod” 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”



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indicators.

Press the SETUP key again to get more SOFT KEYS.



Press the SETUP key until you return to the original set of SOFT KEYS.

A “Stacked” SOFT KEY (shown 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, repeatedly press the SETUP key until you see the stacked SOFT KEY `midi`. Press `midi`.



Press it again to get a second menu page.



Press it again to get a third menu page.

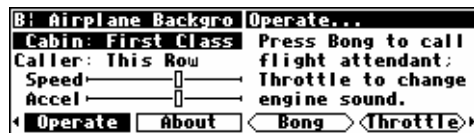


Press it until you return to the original menu page.

Pressing a SOFT KEY repeatedly that is *not* stacked puts Orville 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 20.



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 *menu* page SOFT KEYS are rectangular, whereas *trigger* SOFT KEYS are hexagonal. On this screen `Operate` and `About` are menu pages, and `<Bong>` and `<Throttle>` are triggers.

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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, BYPASS, and SETUP areas. We'll discuss their use in the PROGRAM and Routing Storage areas in a bit.

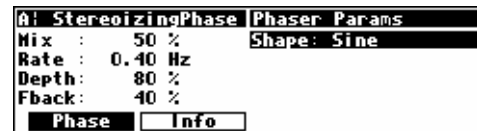
Use of the cursor keys is straightforward. The LEFT and RIGHT CURSOR keys move the cursor left and right, respectively. If you move the cursor "past the edge of the screen," it will "wrap" around to the other side. The UP and DOWN CURSOR keys move the cursor up and down, respectively. Again, the top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

Use the KNOB, NUMERIC KEYPAD, or the INC/DEC keys to alter the value of a numeric 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). *If you accidentally enter the same value for the parameter with the NUMERIC KEYPAD as was already there, ENT will have no effect. To "escape" from this situation, repress the SOFT KEY for the current menu or move the cursor. For example, if you type 50 for Mix in the above screen, ENT will have no effect. Press [PHASE] again or move the cursor to "escape."*



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

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



Numeric parameters and text parameters cover 99% of the parameters you'll see in Orville, but there are a few more esoteric parameters you'll encounter. One such oddball is the "trigger" parameter. Remember, "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 **Graphics and Curves** on page 90.



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 **outputs** menu page in the SETUP area contains a good example of ganged parameters. The purpose of this menu page is to assign signals to the outputs. Such assignments are typically made in quad or stereo gangs. So, all four parameters are initially ganged together. Spin the KNOB and all four values change.



Now let's say you only want to change ANA1 and ANA2. Press the DOWN CURSOR key to "ungang" ANA3 and ANA4. Now spin the KNOB; only the values for ANA1 and ANA2 change.



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Going further, let's say you only want to change the value of ANA1. Again, press the DOWN CURSOR key to "ungang" ANA2. Now spin the KNOB; only the value of ANA1 changes. Press the DOWN CURSOR key to repeatedly cycle through the various gang possibilities: next ANA2 alone is selected, then ANA3 and ANA4 are ganged together, then ANA3 is alone, then ANA4 is alone, and lastly we arrive at our starting point - all four parameters are ganged together. 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 Orville as their presence facilitates many tasks.

A:	Program Name, ya	Output Routing
dsp A out 2 (+)		-----> ANA1
dsp B out 4 (+)		-----> ANA2
dsp A out 3 (+)		-----> ANA3
dsp A out 4 (+)		-----> ANA4

← clock inputs dsp A outputs →

Using the Cursor Keys and the KNOB in the PROGRAM and Routing Storage Areas

Now, let's investigate the use of the cursor keys and the KNOB in the PROGRAM area (*they work just the same in the Routing 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 LEFT and RIGHT CURSOR keys scroll through banks (banks are "manila folders" for programs. *See Banks on page 79*). 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:

A:	Thru'	program
banks	0 (3)	
programs ▶	10 Orville's Banks	⊘
	11 Mute	⊘
	12 Thru'	⊘ 44

← load save update delete →

Press either the LEFT or RIGHT 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).

A:	Thru'	program
banks	0 (3)	
programs ▶	10 Orville's Banks	⊘
	11 Mute	⊘
	12 Thru'	⊘ 44

← load save update delete →

With the cursor in the bank field, press the LEFT or RIGHT CURSOR key to scroll through banks. Spinning the KNOB also scrolls through banks. Pressing the RIGHT CURSOR key three times on the above screen would scroll through banks and result in the screen to the right.

A:	Thru'	program
banks	3 Basics (14)	
programs ▶	10 BasicRoom	⊘ 24
	11 Compressor_4	⊘ 44
	12 Compressor_0	⊘ 44

← load save update delete →

Press the UP or DOWN CURSOR key when the cursor is in the bank field (as on the above screen) to move the cursor to the programs field (as shown to the right).

A:	Thru'	program
banks	3 Basics (14)	
programs ▶	10 BasicRoom	⊘ 24
	11 Compressor_4	⊘ 44
	12 Compressor_0	⊘ 44

← load save update delete →

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With the cursor in the programs field, press the UP or DOWN CURSOR key to scroll through programs. Spinning the KNOB also scrolls through programs. Pressing the DOWN CURSOR key twice on the above screen would scroll through programs and result in this screen.

A: Thru?	program
banks	3 Basics (14)
programs	11 Compressor_4 f 44
	▶ 12 Compressor_0 f 44
	13 Delays_4 f 44
◀ Load ▶ save ▶ update ▶ delete ▶	

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Press the **SELECT** key, the <load> **SOFT KEY**, or the **ENT** key to load the program shown in the display with a triangle next to its number. On the above screen “12 Compressor_Q” has the triangle next to its number.



Pressing **SELECT**, <load>, or **ENT** would load “Compressor_Q” and result in this screen. Notice that the upper left-hand corner of the display reflects the fact that “Compressor_Q” is now the current program running on DSP A.

The moral of the story? Use the **LEFT** and **RIGHT CURSOR** keys 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.

→ To learn how to remotely load programs, read **Loading a Program Remotely** on page 82.

Entering or Changing Text

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 played 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 Orville to the rest of your gear.
2. On page 26 we’ll route signals between all of those inputs, outputs, and DSPs you’ve been reading so much about.
3. On page 29 we’ll set the input levels so that things don’t distort.
4. On page 30 we’ll learn how to “mute” Orville in the event of feedback.
5. On page 32 we’ll run programs on DSP A and DSP B and “tweak” their parameters.
6. Finally, on page 34 we’ll learn how to save the programs you’ve “tweaked” for future use.

Hooking Up

Before we concentrate on what happens *inside* Orville, we ought to get it hooked up to the rest of your studio. As was stated in the overview, we have four analog inputs, four analog outputs, four digital inputs, and four digital outputs all at our disposal all the time.

→ See **The Back Panel** on page 12 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. You may want to split up the four analog inputs. For example, you could connect two effects sends to analog inputs 1 and 2 and the output of a stereo preamplifier to analog inputs 3 and 4. 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 29.

Hook up the balanced analog outputs to suitable input recipients, such as an analog mixer or an amplifier. As with the analog inputs, you may wish to split up the four analog outputs.

Hook up the digital inputs to suitable output sources, such as a DAW (digital audio workstation) or a keyboard with digital outputs. Unlike the analog interface, the sources of your digital signals must come in pairs. Further, digital inputs 1 and 2 are taken from either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack (see below to learn how to switch between the two). Digital inputs 3 and 4 are necessarily taken from the AES/EBU 3/4 input jack.

Hook up the digital outputs to suitable input recipients, such as a DAW, a sampler, or a DAT machine. As with the digital inputs, the recipients of your digital signals must come in pairs. Further, digital outputs 1 and 2 are sent from either the AES/EBU 1/2 output jack or the S/P DIF 1/2 output jack (see below to learn how to switch between the two). Digital outputs 3 and 4 are necessarily sent from the AES/EBU 3/4 output jack.

Note: You don’t have to hook up all 16 inputs and outputs! Just be mindful of which are hooked up and which aren’t when we get to routing, below.

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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**).

```
A: Program Name, ya Sample Rates
Source: Int 48.0 kHz DIN 1/2: (OK)
Sample Rate: 48000 DIN 3/4: (unlocked)
High Speed: disabled
Word Clock: disabled
< clock inputs dsp A outputs >
```

If you are using the digital inputs, set the parameter Source to AES/EBU 1/2 or S/P DIF 1/2 (depending on which you've selected as the digital input; see the paragraph below). Orville will derive its sampling rate from digital inputs 1/2.

```
A: Program Name, ya Sample Rates
Source: S/P DIF 1/2 DIN 1/2: (unlocked)
Sample Rate: 48000 DIN 3/4: (unlocked)
High Speed: disabled
Word Clock: disabled
< clock inputs dsp A outputs >
```

Digital inputs 1/2 are "taken" from either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack. Select one or the other with the parameter IN 1/2 on the **inputs** menu page. If you are only using two digital inputs, you must connect them to digital inputs 1/2 (either the AES/EBU input or the S/P DIF input).

```
A: Program Name, ya Setup Inputs
IN 1/2: S/P DIF
< clock inputs dsp A outputs >
```

If digital inputs 3/4 aren't synchronized to inputs 1/2 at the source, use the sample rate converter. Turn SRC Mode 3/4 to on. In the example shown to the right, digital inputs 3/4 will be sample rate converted to the sample rate of digital inputs 1/2, 48000 Hz.

```
A: Timeout Spore Sample Rate Conv
SRC Mode 1/2: on Status 1/2: OK
SRC Mode 3/4: on Status 3/4: OK
Input SR 1/2: 48000
Input SR 3/4: 44100
< clock inputs dsp A outputs >
```

Digital outputs 1/2 are "sent" to both the AES/EBU 1/2 output jack and the S/P DIF 1/2 output jack, but they can only be sent in *one* format, "consumer" or "professional". Select S/P DIF on the "bottom" **format** menu page in the **SETUP** area to select the "consumer" format; select AES/EBU to select the "professional" format.

```
A: GuitarTuner Dig I/O Format 2
DOOT 1/2: AES/EBU
< format tempo timer pedals >
```

Digital inputs and outputs 3 and 4 *must* be "taken" from the AES/EBU 3/4 input jack and "sent" to the AES/EBU 3/4 output jack. This is because there is no S/P DIF 3/4 jack.
→ To read about the digital setup in more detail, see **Digital Setup** on page 56.

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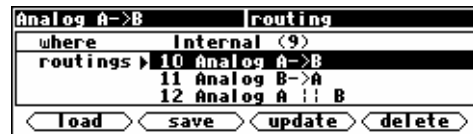
Loading Routing Configurations

As was stated in the overview, Orville houses two separate DSP engines. DSP A is always running a program, and DSP B is always running another program. The program running on DSP A does not necessarily have anything to do with the program running on DSP B, and the program running on DSP B does not necessarily have anything to do with the program running on DSP A! (The display can only show the parameters for one of them at a time - use the DSP A/B key to toggle between displays.)

While functioning of DSP A is quite independent of DSP B and vice versa, we can *route* signals between them. Each DSP can accept four input signals and produce four output signals. What's more, Orville is equipped with four analog inputs, four analog outputs, four digital inputs, and four digital outputs. All of these inputs and outputs can be used *simultaneously*. The signal routing between the various ins and outs and the two DSPs is comprehensive and can be manually configured in just about any way imaginable. However, for the purposes of this "Instant Gratification" section, we'll stick to the routing configurations that come as presets in Orville. (Besides, you'll probably use these preset configurations most of the time because they cover the most obvious and necessary routing configurations.)

→ To learn how to manually configure the routing configuration, see **Signal Flow Inside Orville** on page 38.

To access the preset routing configurations, press and hold down the PROGRAM key for one second to enter the Routing Storage area. The LED next to the PROGRAM key will begin to blink and the upper right-hand corner of the display will read "routing."

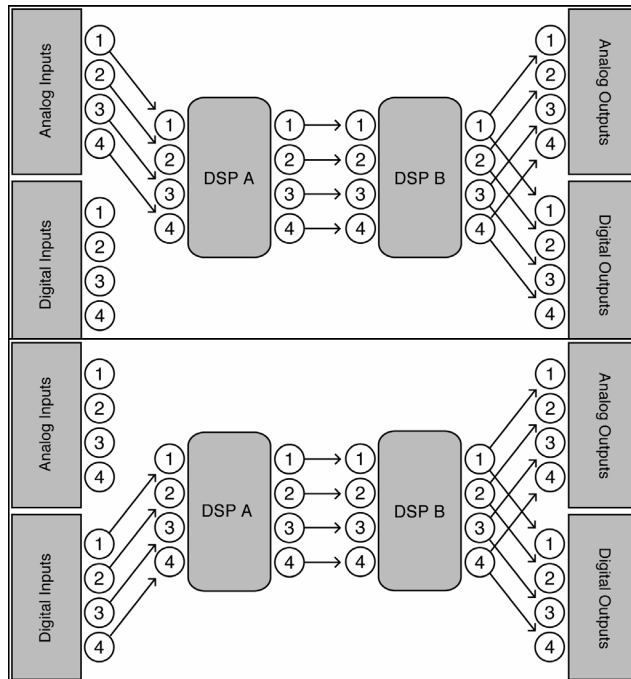


Use the UP and DOWN CURSOR keys to place the cursor over the routing configuration you would like to load and then press the <load> SOFT KEY. Below, we describe each preset routing configuration in English and complement that description with a block diagram. The routing configuration "name" as saved in Orville follows each description.

→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 92.

"Analog A->B" - Analog Serial Quad

All four analog inputs go into DSP A, the output from DSP A goes into DSP B, the output from DSP B goes into both the analog outputs the digital outputs.



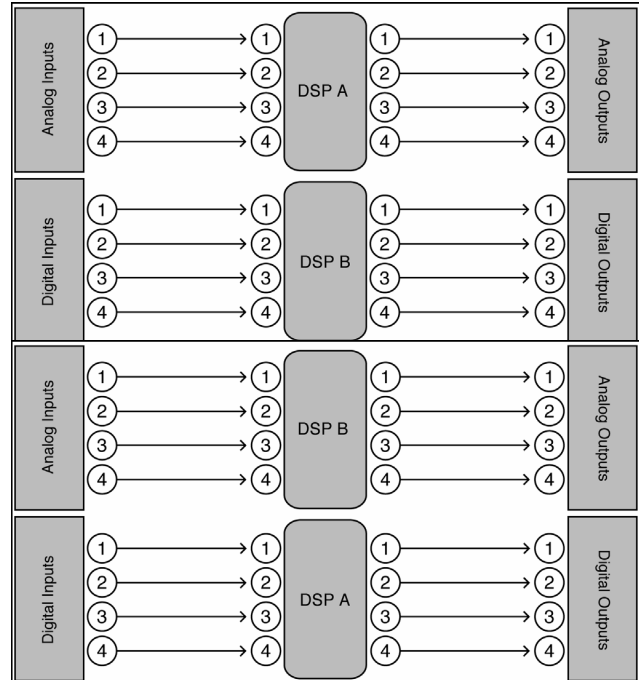
"Digital A->B" - Digital Serial Quad

All four digital inputs go into DSP A. The outputs from DSP A go into DSP B, the outputs from DSP B go into both the analog and digital outputs.

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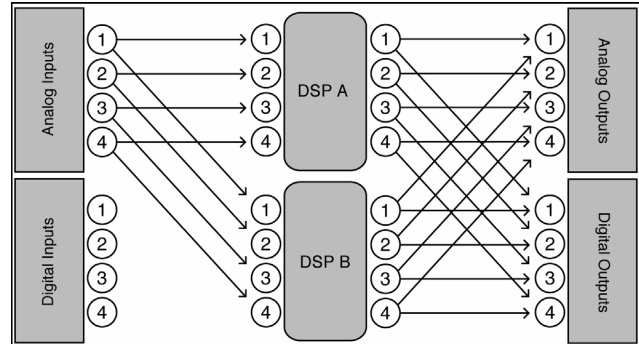
“Eight Track A,B” - Eight Track 1

All four analog inputs go into DSP A, out from DSP A into the analog outputs. All four digital inputs go into DSP B, out from DSP B into the digital outputs.



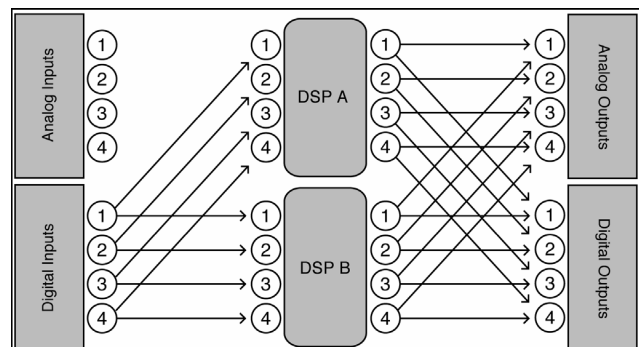
“Eight Track B,A” - Eight Track 2

All four analog inputs go into DSP B, out from DSP B into the analog outputs. All four digital inputs go into DSP A, out from DSP A into the digital outputs.



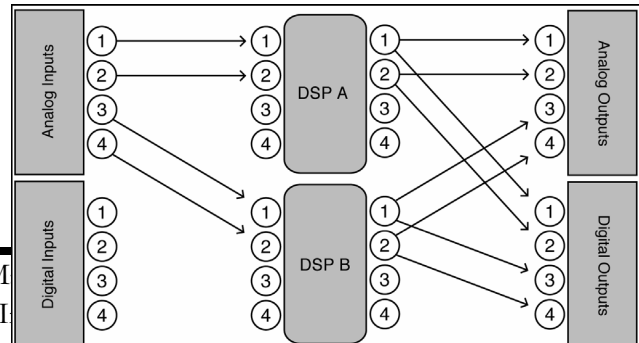
“Analog A || B” - Analog Parallel Quad

All four analog inputs go into DSP A and DSP B, all four outputs from both DSP A and DSP B are summed at the analog outputs and the digital outputs.



“Digital A || B” - Digital Parallel Quad

All four digital inputs go into DSP A and DSP B, all four outputs from both DSP A and DSP B are summed at the analog outputs and the digital outputs.



“Analog Dual Stereo”

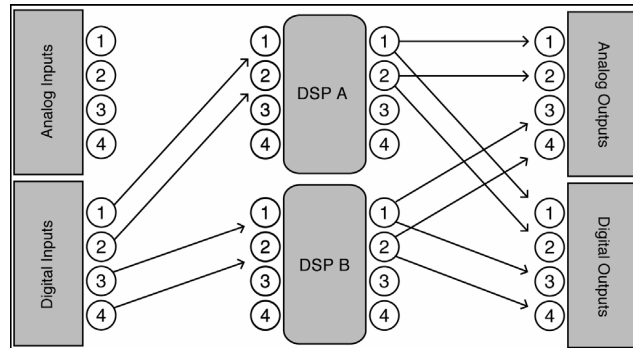
Analog inputs 1 & 2 go into DSP A 1 & 2, DSP A outs 1 & 2 go into analog outputs 1 & 2 and digital outputs 1 & 2. Analog inputs 3 & 4 go into DSP B

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1 & 2, DSP B outs 1 & 2 go into analog outputs 3 & 4 and digital outputs 3 & 4.

“Digital Dual Stereo”

Digital inputs 1 & 2 go into DSP A 1 & 2, DSP A outs 1 & 2 go into analog outputs 1 & 2 and digital outputs 1 & 2. Digital inputs 3 & 4 go into DSP B 1 & 2, DSP B outs 1 & 2 go into analog outputs 3 & 4 and digital outputs 3 & 4.



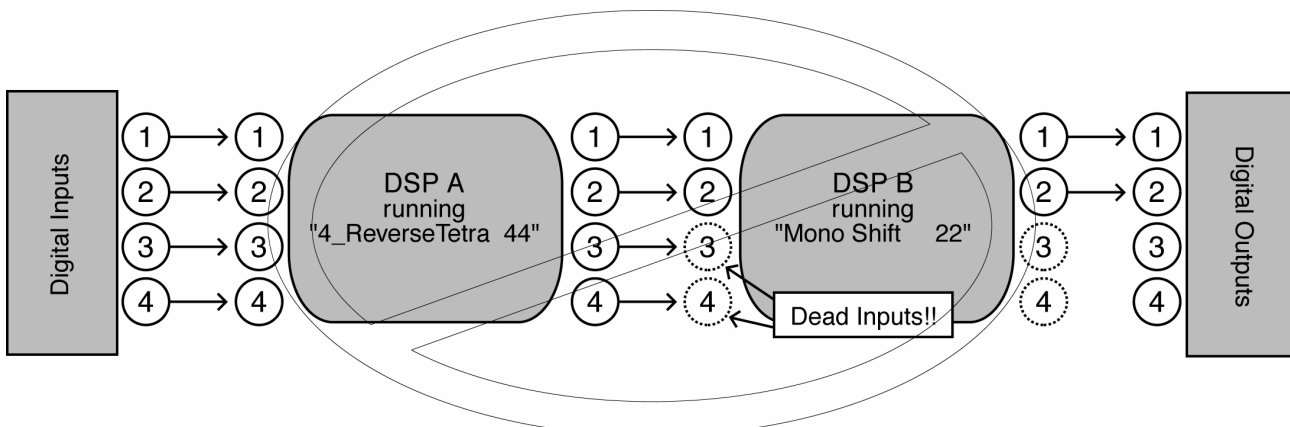
The I/O Identifier

While each DSP has four inputs and four outputs, it's not necessarily the case that every program will utilize all four inputs or all four outputs of the DSP it's running on. Every program is unique and uses only the number of inputs and outputs that are necessary for its function. For instance, a program that synthesized sound would not need any inputs! A program that modulated one stereo signal with another would need all four inputs (two for the carrier and two for the modulator) but only two outputs (for the result of the modulation). Again, the function of a program determines how many inputs and outputs are utilized on the DSP running the program.

Notice that to the far right of every program name in the PROGRAM area is a two digit number (press the **PROGRAM** key to get there). This two digit number is known as the “I/O Identifier.” In the case of the program “IntervalicShift_Q” shown to the right, the two digit number is “44.” In the case of the program “H910s” shown to the right, the two digit number is “22.” The first digit indicates how many inputs are utilized, and the second digit indicates how many outputs are utilized. If the “I/O Identifier” for a program were “13,” DSP input 1 would be used while inputs 2, 3, and 4 were dead, and DSP outputs 1, 2, and 3 would be used while output 4 was dead. A program will utilize the same number of inputs and outputs regardless of whether it is loaded on DSP A or DSP B.

A: Compressor_0	Program
banks	54 Shifters (27)
programs	19 H910s f 22
	20 IntervalicShift_Q 44
	21 IntervalicShift_S 22
<input type="button" value="Load"/> <input type="button" value="save"/> <input type="button" value="update"/> <input type="button" value="delete"/>	

→Some programs have no I/O identifier. See *If the I/O Identifier is not visible* on page 48 for more information.



Those DSP inputs or outputs that are *not* used by the program are “dead” - no signals are passed by them.

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Knowing which inputs and outputs a program uses can affect which routing configuration you choose to use. You probably wouldn't want to place a program that only utilized two inputs after a program that utilized all four outputs because two of those outputs would be connected to "dead" inputs. (*Of course, it wouldn't hurt anything if you did, but the signals at the two outputs connected to "dead" inputs would be "lost."*) This scenario is depicted in the diagram above.

It's important for you to think about which inputs and which outputs from DSP A and DSP B are "dead" in the context of the routing configuration you've chosen.

→ For more information on this topic, including examples, see **Programs' Effect on Routing Decisions** on page 48.

Setting Input Levels

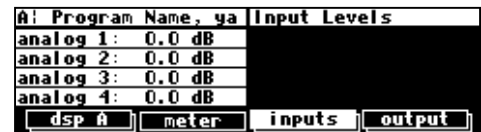
As we're sure you know, getting a high, but not distorted, signal at every point in a signal path is essential. The Level Meters help us to achieve this goal. In the LEVELS area go to the `meter` menu page to reach this screen. Adjust `Source` (with the KNOB or the INC/DEC keys) to read either `analog in` or `digital in` depending on which input levels you would like to view. The four Level Meters now reflect either the four analog inputs or the four digital inputs.



In this cursory introduction, we 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 53.
- **Input Levels, Wet/Dry Ratios, and Output Levels for Each DSP** on page 54.
- **Controlling the Level of the Analog and Digital Outputs** on page 55.



Of course, it's always best to optimize levels at their source (leaving Orville's boost/cut at 0dB). But if you can't, then go to the `inputs` menu page in the LEVELS area. Press it twice so that only the analog input levels are shown. Here you can boost/cut the analog inputs by +30dB/-90dB before they are digitally converted.

You can cut the analog inputs *after* digital conversion and the digital inputs by 0db/-100dB on the first `inputs` page.

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 the boost/cut is applied). 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 Orville, but you will hurt your chances for career advancement - a clipped signal typically sounds nasty.

→ For more information on setting input levels see **Controlling the Level of the Analog and Digital Inputs** on page 53.



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Effecting Things

"The effect on your affect of Orville's effects will positively affect your popularity."

-Anonymous

"Panic" Muting

In a moment you'll be loading and playing with programs, but before you do let it be said that Orville 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 such a situation.

```

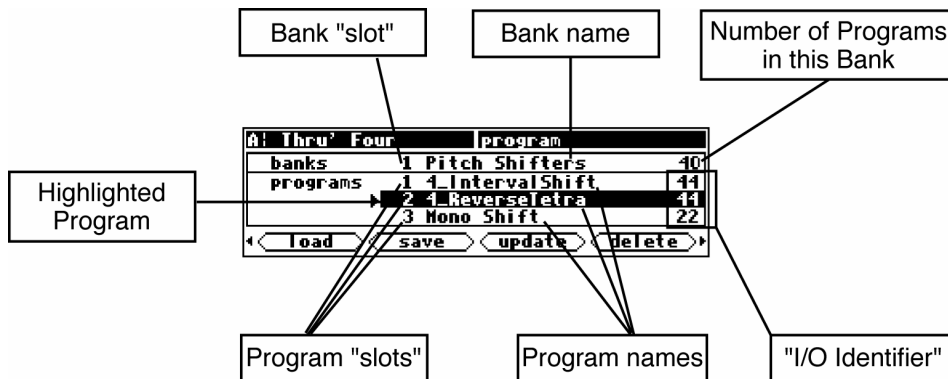
A: DILATIONLOOP ONE bypass options
system: mute
machine: dsp bypass

<system> <bypass A> <bypass B> options
    
```

Let's arrange things so that *pressing and holding* the **BYPASS** key for *one second* mutes all of Orville's outputs. Go to the **options** menu in the BYPASS area. Change the value of the system parameter to mute as shown above (with the KNOB or the INC/DEC keys). Now hold down the **BYPASS** key. After a second the A and B LEDs begin to blink - you've muted Orville. To unmute, simply hold down the **BYPASS** key again.

→ For more information see **ByPassing and Muting** on page 64.

→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 92.



Loading Programs

Assuming you've loaded an appropriate routing configuration, Orville should be ready to process! All that remains is to load a program into each DSP. To load a program, 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 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 Orville, 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 80.

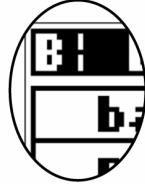
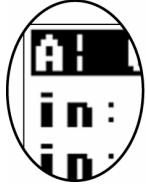
The "Speed" indicator (slightly like a lightning symbol) indicates that this program can be loaded and run in *high speed* mode, for use at 88.2kHz and 96kHz sampling rates.

→ See **Sampling Rates** on page 57 for more information on speed modes.

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Use the **LEFT** and **RIGHT CURSOR** keys to scroll through banks and 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 high-lighted program.

→ For the finer nuances of PROGRAM area navigation read Using the Cursor Keys and the KNOB in the PROGRAM and Routing Storage Areas on page 21.



When you highlight a program you want to load into the currently displayed DSP (referred to by the letter in the upper left-hand corner of the screen), press the **SELECT** key. If you want to load the program into the DSP *not* currently displayed, press the **DSP A/B** key. Doing so will toggle the display to the other DSP.

Let's load some programs, shall we?

A: Compressor_0		program
banks	10	Dynamics (19)
programs	10	Auto V/O Ducker f 22
	11	Bigger Is Wider f 22
	12	Comp(FiveBand)_S 22
◀ load ▶		◀ save ▶
◀ update ▶		◀ delete ▶

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

A: Bigger Is Wider		program
banks	10	Dynamics (19)
programs	10	Auto V/O Ducker f 22
	11	Bigger Is Wider f 22
	12	Comp(FiveBand)_S 22
◀ load ▶		◀ save ▶
◀ update ▶		◀ delete ▶

Pressing the **DSP A/B** key would toggle the display so that we could load a program into DSP B.

B: Singularity		program
banks	2	Artist Bank (18)
programs	10	Amp-u-lation f 22
	11	Backward Garden 3 22
	12	Enhancer f 22
◀ load ▶		◀ save ▶
◀ update ▶		◀ delete ▶

Scrolling through banks and programs would do good things for our hand-eye coordination.

B: Singularity		program
banks	8	Delays - Modulated (47)
programs	13	Chorus_5 f 22
	14	ChorusDelays f 22
	15	Chorused Cabinet f 22
◀ load ▶		◀ save ▶
◀ update ▶		◀ delete ▶

Pressing **SELECT** on the screen above would load the program "ChorusDelays" into DSP B. Notice that the upper left-hand corner of the display reflects the fact that "ChorusDelays" is loaded on DSP B on the screen to the right.

B: ChorusDelays		program
banks	8	Delays - Modulated (47)
programs	13	Chorus_5 f 22
	14	ChorusDelays f 22
	15	Chorused Cabinet f 22
◀ load ▶		◀ save ▶
◀ update ▶		◀ delete ▶

Note that many of the programs in the "Inst" series are designed so that a foot pedal connected to the foot pedal jack will control the output volume. If you don't have a foot pedal hooked up, go to the **external** menu page in the **SETUP** area (you may have to press **SETUP** a few times to see it). Making sure that the upper right corner of the screen reads "assign 1 setup" and change mode to high. This will allow you to hear these programs!

A: Bit Desert 1		assign 1 setup
mode: high		<input type="checkbox"/> Capture Midi
100.0%		
◀ midi ▶	external	display pedals ▶

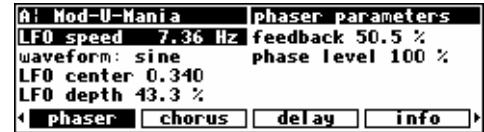
→ See Foot Pedals 1 and 2 on page 66 and The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 & 2 on page 79

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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 Orville is a unique "algorithm." Each unique algorithm (i.e., program) calls for its own unique parameters.

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



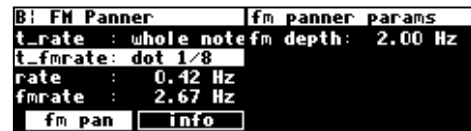
A huge number of Orville's LFO's, delay times, reverb decays, etc. are designed to synch to an *system tempo* defined on the `tempo` menu page in the SETUP area. Say you're working on a song that's at 130 BPM. Simply set the system tempo to 130 and most of Orville's LFO's and delay times will be appropriate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



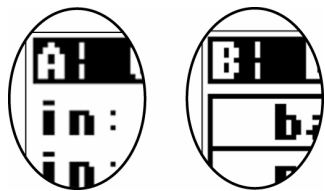
Parameters that synch to the system tempo are identified by "t_" such as "t_rate" and "t_fmrate" and are adjusted in musical terms such as "whole note" and "dot 1/8". You will find them in the PARAMETER area of most programs.

→ See System Tempo on page 88

→ Some parameters, such as delay loops, use the system timer. They are also denoted by "t_". See System Timer on page 89



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."



The parameters displayed in the PARAMETER area pertain to the program running on the currently displayed DSP (referred to by the letter in the upper left-hand corner of the screen). If you would like to fiddle with the parameters for the program running on the DSP *not* currently displayed, press the DSP A/B key. Doing so will toggle the display to the DSP you want.

For example, here we're adjusting parameters for the program "4*6 Grafic Eq" that is loaded on DSP A.



Pressing the DSP A/B key toggles the display from parameters for the program running on DSP A to parameters for the program running on DSP B. After pressing the DSP A/B key, we get the screen to the right. Now we can adjust parameters for the program "4_Interval shift" that is loaded on DSP B.

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Many, but by no means all, of the programs in Orville 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. 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 92 for information on the other keys 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 66.

External Modulation and Trigger Menu Pages on page 70.

Remote Controlling Parameters on page 83.

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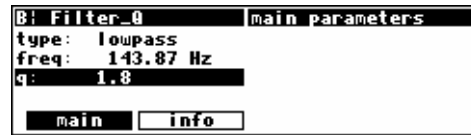
"Tweaking" and Saving "Tweaks"

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 the program "Filter_Q" from the "Basics" bank.



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



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.



Press the <save> SOFT KEY. You'll see a pop-up menu with a few options.

The "bank" line allows you to select which bank in which you will save the program.

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 that do not already have a program assigned to them (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 79.

→ To learn how to enter text, see **Entering or Changing Text** on page 23.

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.



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!*



→ To read about using Memory Cards, see **Memory Cards** on page 36.

→ To update a program you have already saved, see **Updating a Program** on page 84.

→ To link programs from different banks (for ease of loading in, say, a live situation), see **"Linking" Programs** on page 85.

→ To compare your tweaks with the saved version of a program, see **Comparing a Currently Loaded Program With The Original (Saved) Version** on page 87.

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Wrap Up

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 Orville. First, you will determine an appropriate routing configuration for the task at hand and either load it from the Routing area or make it from scratch (you'll learn how in the **Operation** guide). Then, you'll load appropriate programs into DSP A and DSP B being mindful of the "I/O Identifiers" and their bearing on the routing configuration. *This may be an over-simplification! You may very well select appropriate programs for the task at hand and then determine an appropriate routing configuration for those programs!* Once the routing configuration is set and the programs are loaded, you'll probably "tweak" the parameters on those programs to fit the situation. When you're done using a program, you'll probably save your "tweak" for future use.

Doing this much will give you an appreciation of the horsepower under the hood of Orville. But *only* doing this much *won't* give you an appreciation of the amazing versatility of Orville:

- In addition to simply loading routing configurations, you can manually configure things any way you like.
→ See **Signal Flow Inside Orville** on page 38.
- 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 51.
- Programs and routing configurations can be saved to and loaded from removable Memory Cards, as well as internal memory.
→ See **Memory Cards** on page 36.
- In addition to using system bypass, DSP A and DSP B can be muted or bypassed independently of each other.
→ See **Bypassing and Muting** on page 64.
- 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 82.
- The digital inputs and outputs have comprehensive sample rate and word length parameters to complement any digital installation.
→ See **Digital Setup** on page 56.
- Any program anywhere in Orville can be "remote controlled" via MIDI or the rear panel foot pedal jacks 1 and 2.
→ See **Setting Up the External Controllers** on page 66, **External Modulation and Trigger Menu Pages** on page 70, and **Remote Controlling Parameters** on page 83.
- Existing programs can be altered or entirely new programs can be created in the Patch Editor.
→ See the separate Programmer's Manual.

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OPERATION

Mounting and Handling

Normally, Orville will be rack mounted in a standard 19 inch rack. If the rack will be taken on the road, Orville 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 Orville. Since Orville 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 524,288 bytes (1/2 a megabyte), although Orville will support cards up to 4,194,304 bytes (4 megabytes). (Note: Memory Cards must be "PCMCIA type 1 static RAM card" - Orville 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. . .

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 Li-brary". . 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 Routing 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."*

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When a Memory Card is inserted, Orville 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 100.

→ To learn how to create a new bank, see **Creating a New Bank or Renaming an Old Bank** on page 80.

→ 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 80.

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 100.

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THE COMPREHENSIVE INPUT / OUTPUT SCHEME

All right, the word “comprehensive” has been used a bit much in this manual so far, but it’s appropriate! The various inputs, outputs, and DSPs can be connected in just about any way you can think of!

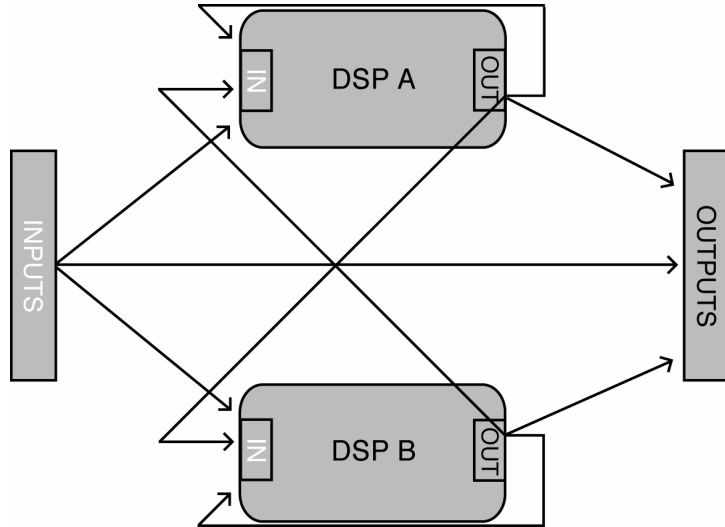
Signal Flow *Inside* Orville

Routing is accomplished inside Orville by assigning “sources” to:

- the inputs of DSP A
- the inputs of DSP B
- the analog outputs
- the digital outputs

The available “sources” are:

- the analog inputs
- the digital inputs
- DSP A’s outputs
- DSP B’s outputs



The diagram to the right displays the routing possibilities in a simplified form.

We will now zoom in on the actual menu pages used for routing. Look back frequently to the adjacent diagram so as not to “lose the forest for the trees.”

Selecting “Sources” for Each DSP

To select “sources” for DSP A, go to the `[dsp A]` menu page in the **SETUP** area. By spinning the **KNOB** on the left side of the menu page, we scroll through our “source” options:

A: Filter_0		Dsp A i/p routing	
Analog in 1	-> IN1	A IN1	Gain: 0.0 dB
Analog in 2	-> IN2	A IN2	Gain: 0.0 dB
Analog in 3	-> IN3	A IN3	Gain: 0.0 dB
Analog in 4	-> IN4	A IN4	Gain: 0.0 dB
← clock		inputs	dsp A
			outputs

analog in x	Connects analog input x,1, 2, 3, or 4 to one of DSP A’s four inputs.
S/P DIF <i>or</i> AES/EBU in x	Connects digital input x,1, 2, 3, or 4 to one of DSP A’s four inputs.
dsp A out x	Connects DSP A’s output x,1, 2, 3, or 4 to one of DSP A’s four inputs. Yes, if you hook up an output directly to an input, nasty feedback can occur! Use caution.
dsp B out x	Connects DSP B’s output x,1, 2, 3, or 4 to one of DSP A’s four inputs.
-----	Connects “silence” to one of DSP A’s four inputs.

Although it will frequently be the case that analog inputs 1 through

A: Filter_0		Dsp A i/p routing	
Analog in 4	-> IN1	A IN1	Gain: 0.0 dB
AES/EBU in 3	-> IN2	A IN2	Gain: 0.0 dB
dsp A out 1	-> IN3	A IN3	Gain: 0.0 dB
dsp B out 1	-> IN4	A IN4	Gain: 0.0 dB
← clock		inputs	dsp A
			outputs

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4 will be connected to DSP A's inputs 1 through 4, things don't *have* to be connected in such an orderly way. You can mix and match as the spirit moves you. To the right, we see a particularly pathological assignment. You need only "undo" the ganged parameters by repeatedly pressing the DOWN CURSOR key to select such diverse "sources."

Selecting the "sources" for DSP B is similar to the procedure used for DSP A. You can see that the `[dsp A]` menu page in the SETUP area is "stacked." Pressing either the `[dsp A]` SOFT KEY a second time or pressing the DSP A/B key will reveal that the page "below" `[dsp A]` is an analogous menu page for DSP B. All of the comments made above for DSP A apply here for DSP B.

A: Filter_0	Dsp B i/p routing
dsp A out 1 ->	IN1 B IN1 Gain: 0.0 dB
dsp A out 2 ->	IN2 B IN2 Gain: 0.0 dB
dsp A out 3 ->	IN3 B IN3 Gain: 0.0 dB
dsp A out 4 ->	IN4 B IN4 Gain: 0.0 dB
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp B]</code> <code>[outputs]</code>

→ The right-hand side of these menu pages control the input levels to the DSPs. These parameters are discussed in **Input Levels, Wet/Dry Ratios, and Output Levels for Each DSP** on page 54.

→ 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 66.
- **External Modulation and Trigger Menu Pages** on page 70.
- **Remote Controlling Parameters** on page 83.

Selecting "Sources" for the Outputs

The second step in routing involves selecting "sources" for the four analog outputs and the four digital outputs.

Selecting "sources" for the four analog outputs is done at the `[outputs]` menu page in the SETUP area. Spin the KNOB to scroll through the options:

A: Filter_0	Output Routing
dsp B out 1 (+)	-----> ANA1
dsp B out 2 (+)	-----> ANA2
dsp B out 3 (+)	-----> ANA3
dsp B out 4 (+)	-----> ANA4
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp B]</code> <code>[outputs]</code>

analog in x Connects analog input 1, 2, 3, or 4 directly to one of the analog outputs. The output will be *unprocessed* because both DSP A and DSP B will have been bypassed! Although this connection will rarely be made, it may prove useful in some situations (e.g., playing a dry guitar through Orville).

S/P DIF or AES/EBU in x Connects digital input 1, 2, 3, or 4 directly to one of the analog outputs. The output will be *unprocessed* because both DSP A and DSP B will have been bypassed! Although this connection will rarely be made, it may prove useful in some situations (e.g., using Orville as a digital to analog converter).

dsp A out x Connects DSP A's output 1, 2, 3, or 4 to one of the analog outputs.

dsp B out x Connects DSP B's output 1, 2, 3, or 4 to one of the analog outputs.

----- Connects "silence" to one of the analog outputs.

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The right-hand side of this menu page allows you to connect a second “source” to each analog output. For example, you could sum the outputs of each DSP at the analog outputs as shown to the right. At analog output 1 we would find the outputs of DSP A out 1 and DSP B out 1; at analog output 2 we would find the outputs of DSP A out 2 and DSP B out 2, and so on. *There is a chance that adding loud, but undistorted, signals may result in distortion. To eliminate this possibility, reduce the level of each of the signals being added by -3dB. See **Input Levels, Wet/Dry Ratios, and Output Levels for Each DSP** on page 54 to see how.*

A: Filter_0	Output Routing
dsp A out 1 (+)	dsp B out 1 -> ANA1
dsp A out 2 (+)	dsp B out 2 -> ANA2
dsp A out 3 (+)	dsp B out 3 -> ANA3
dsp A out 4 (+)	dsp B out 4 -> ANA4
clock	inputs dsp B outputs

Although you will often connect “sets” of “sources” to the analog outputs such as “DSP A outputs 1 through 4,” you can connect “sources” in any chaotic combination you choose. Simply “ungang” the parameters by pressing the DOWN CURSOR key. At the right, we see a particularly diverse assignment. . .

A: Filter_0	Output Routing
AES/EBU in 3 (+)	dsp A out 3 -> ANA1
dsp A out 1 (+)	dsp B out 2 -> ANA2
S/P DIF in 1 (+)	S/P DIF in 2-> ANA3
AES/EBU in 3 (+)	Analog in 4 -> ANA4
clock	inputs dsp B outputs

Selecting “sources” for the four digital by pressing the **outputs** SOFT KEY again. The same selections exist here as discussed above for the analog outputs.
 → The menu page “below” this one is discussed in **Sample Rate Conversion (SRC)**

A: Filter_0	Output Routing
dsp A out 1 (+)	-----> DIG1
dsp A out 2 (+)	-----> DIG2
dsp A out 1 (+)	-----> DIG3
dsp A out 2 (+)	-----> DIG4
clock	inputs dsp B outputs

In the absence of sample rate conversion (SRC), you need to make sure that any digital inputs are synchronized to the system sampling rate. Of course, when you select external synchronization, digital inputs 1/2 *are* the system sampling rate. In this case you only need to worry about digital input 3/4.

If for whatever reason you cannot synchronize either digital input to the system sampling rate, use sample rate conversion (SRC). The sample rate conversion page is the “bottom” menu page under **clock** in the **SETUP** area. By turning SRC Mode on for the appropriate digital input, Orville will adjust the input sampling rate to match the system sampling rate. The sample rate before conversion is displayed in the lower right corner of the screen.

The sample rate conversion algorithm is quite good and will generate few, if any, noticeable artifacts. Nevertheless, if you can synchronize the input devices to the Orville without using sample rate conversion, the end result will be just a little better.
 Word Length (Bits) on page 62.

Again, the right-hand side of the page allows two “sources” to be summed at each digital output.
 → 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 66.
External Modulation and Trigger Menu Pages on page 70.
Remote Controlling Parameters on page 83.

Storing and Loading Routing Configurations

Fortunately, you don’t have to wrestle with all those parameters every time you want to change the routing configuration. As you’ll recall, in the **Overview and Quickstart** guide we used the Routing Storage area for loading entire routing configurations in one go. In addition to loading the preset routing configurations that came with Orville, you can also save your own configurations for future use.
 → Block diagrams and descriptions of the preset routing configurations can be found in **Loading Routing Configurations** on page 26.

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Access the Routing 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 "routing." Here we find four SOFT KEYS:



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

These four SOFT KEYS behave exactly as they do in the PROGRAM area, except that there are only two "banks" (Internal and Card) and the DSP A/B key has no effect.

→ See **Loading Programs** on page 81, **Saving a Program** on page 83, **Updating a Program** on page 84, and **Deleting a Program** on page 84 for more details.

→ To change the one second hold time, see **Miscellaneous Setup Options** on page 92.

The parameters on the following routing and levels menu pages are saved in the Routing Storage area:

- SETUP / dsp A used to assign "sources" for DSP A and to alter input levels for DSP A.
- SETUP / dsp B used to assign "sources" for DSP B and to alter input levels for DSP B.
- SETUP / analog used to assign "sources" to the analog outputs.
- SETUP / digital ("top" page only) used to assign "sources" to the digital outputs.
- LEVELS / dsp A used to adjust the Wet/Dry mix for DSP A and the output levels for DSP A.
- LEVELS / dsp B used to adjust the Wet/Dry mix for DSP B and the output levels for DSP B.

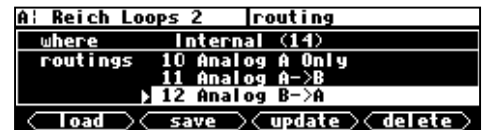
Notice that the analog and digital input levels located on the LEVELS / inputs menu page and the analog and digital output levels located on the LEVELS / output menu page are not saved in the Routing Storage area.

Loading a Routing Remotely Via MIDI

To load a routing remotely, make sure MIDI is enabled, program load is on, and omni mode is off on the midi menu page in the SETUP area. Routings will load in response to program change messages on the MIDI channel that corresponds with base channel + 2.



In the example above, base channel is set to 1. So if we send the program change message "12" on MIDI channel 3 (1 + 2), we would load the routing Analog B->A. You can also load programs on DSP A using (base channel + 0) and on DSP B using (base channel + 1). → See "Loading a Program Remotely" on page 82 for more details.



Signal Flow Examples

Now that we're familiar with the actual menu pages employed in signal routing, let's look at some of the routing configurations we used in the **Overview and Quickstart** Guide. Four main steps are required for routing any configuration:

1. Select "sources" for DSP A's inputs at SETUP / dsp A.

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2. Select “sources” for DSP B’s inputs at SETUP / dsp B.
3. Select “sources” for the analog outputs at SETUP / outputs.
4. Select “sources” for the digital outputs at SETUP / outputs (“bottom” menu page).

Once the routing is configured, you can, at your discretion, change levels at:

- The analog inputs. Use LEVELS / inputs (“bottom” menu page for pre-A/D adjustments, the “top” menu page for post A/D adjustments *(not recommended)* *(not saved in the Routing Storage area)*).
- The digital inputs. Use LEVELS / inputs *(not saved in the Routing Storage area)*.
- The inputs to DSP A. Use SETUP / dsp A.
- The inputs to DSP B. Use SETUP / dsp B.
- The outputs of DSP A. Use LEVELS / dsp A.
- The outputs of DSP B. Use LEVELS / dsp B.
- The analog outputs. Use LEVELS / output *(not saved in the Routing Storage area)*.
- The digital outputs. Use LEVELS / output *(not saved in the Routing Storage area)*.

You can also alter the “Wet/Dry” ratio inside each DSP at LEVELS / dsp A or LEVELS / dsp B.

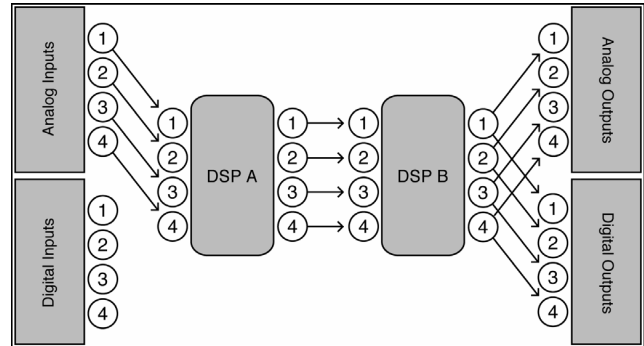
→ These levels parameters are discussed at length in **Controlling Levels** on page 51.

Now, on with the examples!

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Analog Serial Quad

Load the routing configuration “Analog A->B” so you can follow along. Hold down the PROGRAM key until the LED next to it starts to blink. Scroll through the preset routing configurations until you highlight “Analog A->B” and press the SELECT key.



The first thing we need to do is assign the analog inputs to the inputs of DSP A. This is accomplished at the `dsp A` menu page in the SETUP area.

A: Filter_0	Dsp A i/p routing	
Analog in 1	-> IN1	A IN1 Gain: 0.0 dB
Analog in 2	-> IN2	A IN2 Gain: 0.0 dB
Analog in 3	-> IN3	A IN3 Gain: 0.0 dB
Analog in 4	-> IN4	A IN4 Gain: 0.0 dB
◀ clock ▶ inputs dsp A outputs ▶		

Next, we need to assign DSP A's outputs to DSP B's inputs. This is accomplished at the `dsp B` menu page located “beneath” the `dsp A` menu page in the SETUP area.

A: Filter_0	Dsp B i/p routing	
dsp A out 1	-> IN1	B IN1 Gain: 0.0 dB
dsp A out 2	-> IN2	B IN2 Gain: 0.0 dB
dsp A out 3	-> IN3	B IN3 Gain: 0.0 dB
dsp A out 4	-> IN4	B IN4 Gain: 0.0 dB
◀ clock ▶ inputs dsp B outputs ▶		

Next, we need to assign DSP B's outputs to the analog outputs. This is accomplished at the `outputs` menu page in the SETUP area.

A: Filter_0	Output Routing	
dsp B out 1 (+)	-----	-> ANA1
dsp B out 2 (+)	-----	-> ANA2
dsp B out 3 (+)	-----	-> ANA3
dsp B out 4 (+)	-----	-> ANA4
◀ clock ▶ inputs dsp A outputs ▶		

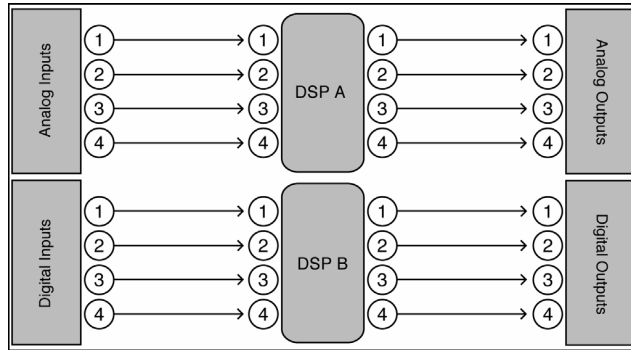
Finally, we need to assign DSP B's outputs to the digital outputs. This is accomplished at the “bottom” `outputs` menu page in the SETUP area.

A: Filter_0	Output Routing	
dsp B out 1 (+)	-----	-> DIG1
dsp B out 2 (+)	-----	-> DIG2
dsp B out 3 (+)	-----	-> DIG3
dsp B out 4 (+)	-----	-> DIG4
◀ clock ▶ inputs dsp A outputs ▶		

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Dual Quad 1

Load the routing configuration “Eight Track A,B” so you can follow along. Hold down the PROGRAM key until the LED next to it starts to blink. Scroll through the preset routing configurations until you highlight “Eight Track A,B” and press the SELECT key.



The first thing we need to do is assign the analog inputs to the inputs of DSP A. This is accomplished at the `[dsp A]` menu page in the SETUP area.

A: Filter_0	Dsp A i/p routing
Analog in 1 ->	IN1 A IN1 Gain: 0.0 dB
Analog in 2 ->	IN2 A IN2 Gain: 0.0 dB
Analog in 3 ->	IN3 A IN3 Gain: 0.0 dB
Analog in 4 ->	IN4 A IN4 Gain: 0.0 dB
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp A]</code> <code>[outputs]</code>

Next, we need to assign the digital inputs to DSP B’s inputs. This is accomplished at the `[dsp B]` menu page located “beneath” the `[dsp A]` menu page in the SETUP area.

A: Filter_0	Dsp B i/p routing
S/P DIF in 1 ->	IN1 B IN1 Gain: 0.0 dB
S/P DIF in 2 ->	IN2 B IN2 Gain: 0.0 dB
AES/EBU in 3 ->	IN3 B IN3 Gain: 0.0 dB
AES/EBU in 4 ->	IN4 B IN4 Gain: 0.0 dB
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp B]</code> <code>[outputs]</code>

Next, we need to assign DSP A’s outputs to the analog outputs. This is accomplished at the `[outputs]` menu page in the SETUP area.

A: Filter_0	Output Routing
dsp A out 1 (+)	-----> ANA1
dsp A out 2 (+)	-----> ANA2
dsp A out 3 (+)	-----> ANA3
dsp A out 4 (+)	-----> ANA4
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp B]</code> <code>[outputs]</code>

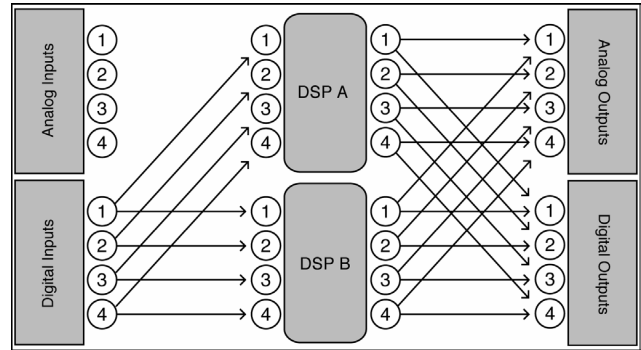
Finally, we need to assign DSP B’s outputs to the digital outputs. This is accomplished at the “bottom” `[outputs]` menu page in the SETUP area.

A: Filter_0	Output Routing
dsp B out 1 (+)	-----> DIG1
dsp B out 2 (+)	-----> DIG2
dsp B out 3 (+)	-----> DIG3
dsp B out 4 (+)	-----> DIG4
<code>[clock]</code>	<code>[inputs]</code> <code>[dsp B]</code> <code>[outputs]</code>

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Digital Parallel Quad

Load the routing configuration “Digital A || B” so you can follow along. Hold down the PROGRAM key until the LED next to it starts to blink. Scroll through the preset routing configurations until you highlight “Digital A || B” and press the SELECT key.



The first thing we need to do is assign the digital inputs to the inputs of DSP A. This is accomplished at the `dsp A` menu page in the SETUP area.

A: Filter_0	Dsp A i/p routing
S/P DIF in 1 ->	IN1 A IN1 Gain: 0.0 dB
S/P DIF in 2 ->	IN2 A IN2 Gain: 0.0 dB
AES/EBU in 3 ->	IN3 A IN3 Gain: 0.0 dB
AES/EBU in 4 ->	IN4 A IN4 Gain: 0.0 dB
clock	inputs dsp A outputs

Next, we need to assign the digital inputs to DSP B’s inputs as well. This is accomplished at the `dsp B` menu page located “beneath” the `dsp A` menu page in the SETUP area.

A: Filter_0	Dsp B i/p routing
S/P DIF in 1 ->	IN1 B IN1 Gain: 0.0 dB
S/P DIF in 2 ->	IN2 B IN2 Gain: 0.0 dB
AES/EBU in 3 ->	IN3 B IN3 Gain: 0.0 dB
AES/EBU in 4 ->	IN4 B IN4 Gain: 0.0 dB
clock	inputs dsp B outputs

Next, we need to assign DSP A’s outputs *and* DSP B’s outputs to the analog outputs. This is accomplished at the `outputs` menu page in the SETUP area. Notice that we’re utilizing the right-hand side of the screen for the second “source.”

A: Filter_0	Output Routing
dsp A out 1 (+)	dsp B out 1 -> ANA1
dsp A out 2 (+)	dsp B out 2 -> ANA2
dsp A out 3 (+)	dsp B out 3 -> ANA3
dsp A out 4 (+)	dsp B out 4 -> ANA4
clock	inputs dsp B outputs

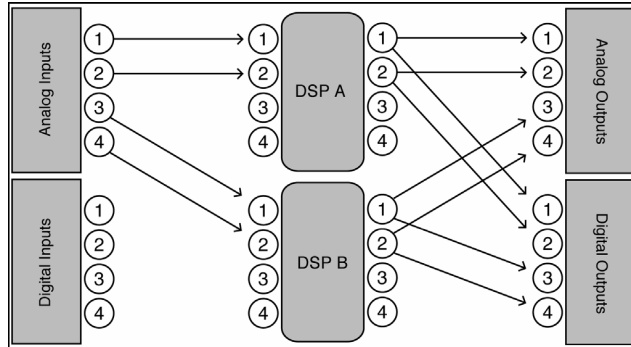
Finally, we need to assign DSP A’s outputs *and* DSP B’s outputs to the digital outputs. This is accomplished at the “bottom” `outputs` menu page in the SETUP area. Again, notice that we’re utilizing the right-hand side of the screen for the second “source.”

A: Filter_0	Output Routing
dsp A out 1 (+)	dsp B out 1 -> DIG1
dsp A out 2 (+)	dsp B out 2 -> DIG2
dsp A out 3 (+)	dsp B out 3 -> DIG3
dsp A out 4 (+)	dsp B out 4 -> DIG4
clock	inputs dsp B outputs

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Analog Dual Stereo

Load the routing configuration “Analog Dual Stereo” so you can follow along. **Hold down** the PROGRAM key until the LED next to it starts to blink. Scroll through the preset routing configurations until you highlight “Analog Dual Stereo” and press the SELECT key.



The first thing we need to do is to assign analog inputs 1 & 2 to inputs 1 & 2 of DSP A. We’ll connect “silence” to inputs 3 & 4 of DSP A. This is accomplished at the `dsp A` menu page in the SETUP area. “Ungang” the cursor by pressing the DOWN CURSOR key.

Ai Filter_0	DSP A i/p routing
Analog in 1	-> IN1 A IN1 Gain: 0.0 dB
Analog in 2	-> IN2 A IN2 Gain: 0.0 dB
-----	-> IN3 A IN3 Gain: 0.0 dB
-----	-> IN4 A IN4 Gain: 0.0 dB

clock | inputs | dsp A | outputs

Next, we need to assign analog inputs 3 & 4 to DSP B’s inputs 1 & 2. We’ll connect “silence” to inputs 3 & 4 of DSP B. This is accomplished at the `dsp B` menu page located “beneath” the `dsp A` menu page in the SETUP area.

Ai Filter_0	Dsp B i/p routing
Analog in 3	-> IN1 B IN1 Gain: 0.0 dB
Analog in 4	-> IN2 B IN2 Gain: 0.0 dB
-----	-> IN3 B IN3 Gain: 0.0 dB
-----	-> IN4 B IN4 Gain: 0.0 dB

clock | inputs | dsp B | outputs

Then, we need to assign DSP A’s outputs 1 & 2 to analog outputs 1 & 2 and DSP B’s outputs 1 & 2 to analog outputs 3 & 4. This is accomplished at the `outputs` menu page in the SETUP area.

Ai Filter_0	Output Routing
dsp A out 1 (+)	-----> ANA1
dsp A out 2 (+)	-----> ANA2
dsp B out 1 (+)	-----> ANA3
dsp B out 2 (+)	-----> ANA4

clock | inputs | dsp B | outputs

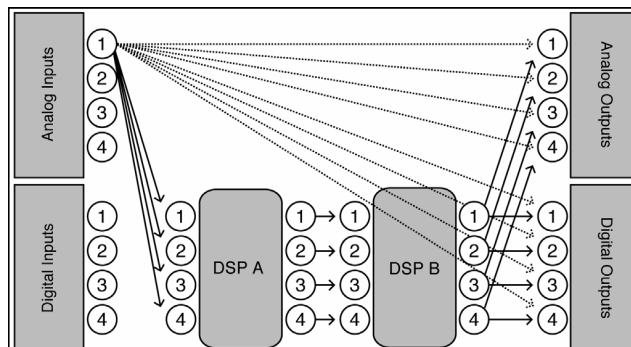
Finally, we need to assign DSP A’s outputs 1 & 2 to digital outputs 1 & 2 and DSP B’s outputs 1 & 2 to digital outputs 3 & 4. This is accomplished at the “bottom” `outputs` menu page in the SETUP area.

Ai Filter_0	Output Routing
dsp A out 1 (+)	-----> DIG1
dsp A out 2 (+)	-----> DIG2
dsp B out 1 (+)	-----> DIG3
dsp B out 2 (+)	-----> DIG4

clock | inputs | dsp B | outputs

Mono To Quad Serial With (Truly) Dry Signal Added to Outputs

OK, this one doesn’t come as a preset routing configuration, so we’ll have to make it from scratch! This sort of routing might be useful for a guitar rig where you’d want the effects to play second fiddle to the dry timbre. (The dotted lines in the diagram are connections just like the solid lines. They’re dotted for clarity.)



First, we need to assign analog input 1 to all of the inputs of DSP A. This is accomplished at the `dsp A` menu page in the SETUP

Ai Filter_0	Dsp A i/p routing
Analog in 1	-> IN1 A IN1 Gain: 0.0 dB
Analog in 1	-> IN2 A IN2 Gain: 0.0 dB
Analog in 1	-> IN3 A IN3 Gain: 0.0 dB
Analog in 1	-> IN4 A IN4 Gain: 0.0 dB

clock | inputs | dsp A | outputs

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area. Remember, *ungang* parameters by pressing the DOWN CURSOR key.

Next, we need to assign the outputs of DSP A to the inputs of DSP B. This is accomplished at the `dsp B` menu page located “below” the `dsp A` menu page in the SETUP area.

A: Filter_0		Dsp B i/p routing	
dsp A out 1 ->	IN1	B IN1 Gain:	0.0 dB
dsp A out 2 ->	IN2	B IN2 Gain:	0.0 dB
dsp A out 3 ->	IN3	B IN3 Gain:	0.0 dB
dsp A out 4 ->	IN4	B IN4 Gain:	0.0 dB
◀ clock		inputs	dsp B
			outputs ▶

Next, we need to assign analog input 1 *along with* the outputs of DSP B to the analog outputs. This is accomplished at the `outputs` menu page in the SETUP area.

A: Filter_0		Output Routing	
Analog in 1 (+)		dsp B out 1 ->	ANA1
Analog in 1 (+)		dsp B out 2 ->	ANA2
Analog in 1 (+)		dsp B out 3 ->	ANA3
Analog in 1 (+)		dsp B out 4 ->	ANA4
◀ clock		inputs	dsp B
			outputs ▶

Finally, we need to assign analog input 1 *along with* the outputs of DSP B to the digital outputs. This is accomplished at the “bottom” `outputs` menu page in the SETUP area.

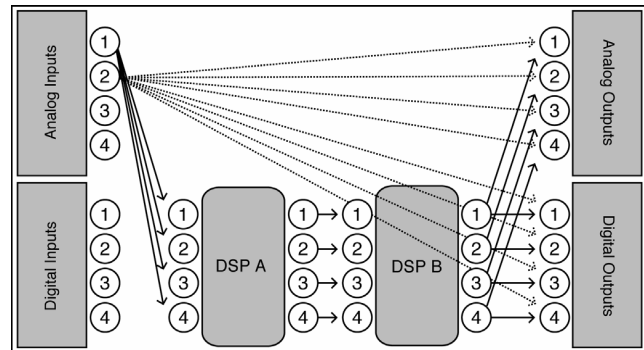
A: Filter_0		Output Routing	
Analog in 1 (+)		dsp B out 1 ->	DIG1
Analog in 1 (+)		dsp B out 2 ->	DIG2
Analog in 1 (+)		dsp B out 3 ->	DIG3
Analog in 1 (+)		dsp B out 4 ->	DIG4
◀ clock		inputs	dsp B
			outputs ▶

Now you may want to turn down the level of the effects relative to the dry level. This amounts to turning down the output level of DSP B which can be accomplished at the `dsp B` menu page located “below” the `dsp A` menu page in the LEVELS area.

A: Filter_0		Machine B Levels	
B OUT1 Wet/Dry	100%	B OUT1 Level	-8.7dB
B OUT2 Wet/Dry	100%	B OUT2 Level	-8.7dB
B OUT3 Wet/Dry	100%	B OUT3 Level	-8.7dB
B OUT4 Wet/Dry	100%	B OUT4 Level	-8.7dB
dsp B		meter	inputs
			output ▶

→ You'll read more about DSP levels in *Input Levels, Wet/Dry Ratios, and Output Levels for Each DSP* on page 54.

If, with DSP B's output level at 0dB, you want the dry level *quieter* relative to the effected level, you'll need to play a trick. Connect your signal to both analog input 1 and analog input 2 (we're talking about the *real, physical* world outside of Orville!).



Leave the routing just as it was, *except* connect analog input 2 directly to the analog and digital outputs instead of analog input 1 on both `outputs` menu pages in the SETUP area. . .

A: Filter_0		Output Routing	
Analog in 2 (+)		dsp B out 1 ->	ANA1
Analog in 2 (+)		dsp B out 2 ->	ANA2
Analog in 2 (+)		dsp B out 3 ->	ANA3
Analog in 2 (+)		dsp B out 4 ->	ANA4
◀ clock		inputs	dsp A
			outputs ▶

Now you can control the dry level by adjusting analog input 2's input level at the `inputs` menu page in the LEVELS area. Note that we changed the value on the "top" menu page, which adjusts the analog signal level *after* it has been digitally converted.

A: Filter_0		Input Levels	
analog 1:	0.0 dB	digital 1:	0.0 dB
analog 2:	-8.4 dB	digital 2:	0.0 dB
analog 3:	0.0 dB	digital 3:	0.0 dB
analog 4:	0.0 dB	digital 4:	0.0 dB
dsp A		meter	inputs
			output ▶

→ You'll read more about changing the input levels in *Controlling the Level of the Analog and Digital Inputs* on page 53.

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Programs' Effect on Routing Decisions

As you'll recall from the *Quickstart* Guide, to the right of every program name in the PROGRAM area are two digits called the "I/O Identifier." On the screen shown to the right,

- "CircleRingTaps2" has an "I/O Identifier" of "44"
- "Texture 47" has an "I/O Identifier" of "24"
- "Mono Delay" has an "I/O Identifier" of "22"

B: m_4ColorDelays	program	
banks	2 Delay Effects	43
programs	10 CircleRingTaps2	44
	11 Texture 47	24
	12 Mono Delay	22
◀ load ▶ save ▶ update ▶ delete ▶		

To understand why the "I/O Identifier" is necessary, we must first understand that, although each DSP has four inputs and four outputs, it is not necessarily the case that all of those inputs and outputs will be utilized by a given program. As has been stated elsewhere in this manual, each program is a unique algorithm. The particulars of a given algorithm dictate how many inputs and outputs will be used, just as they dictate what sorts of parameters are used. For example, a program that acted as a synthesizer would not need any inputs. A program that turned a mono signal into a pseudo-quad signal would only need one input. A program that modulated one stereo signal with another stereo signal would only need two outputs.

So, the "I/O Identifier" tells us at a glance how many inputs and outputs a program uses. The first digit refers to the number of active (live) inputs to the program, and the second digit refers to the number of active (live) outputs to the program. The way these digits correspond to actual inputs and outputs is as you would expect:

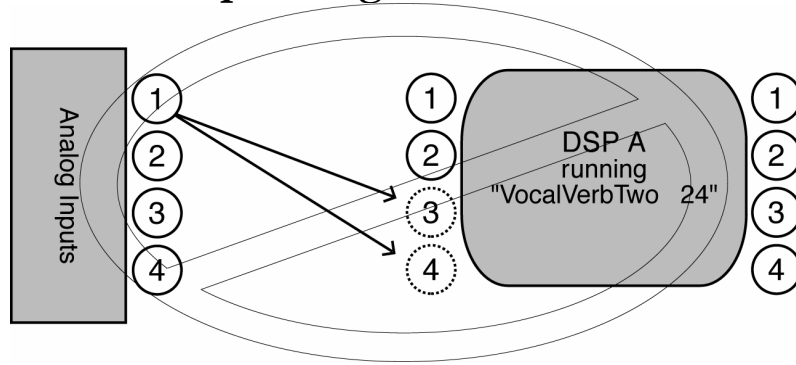
- 0 x the program has no inputs. It could be an oscillator or sound effects generator.
- 1 x input 1 is live; inputs 2, 3, and 4 are dead.
- 2 x inputs 1 and 2 are live; inputs 3 and 4 are dead.
- 3 x inputs 1, 2, and 3 are live; input 4 is dead.
- 4 x all of the inputs are live.
- x 0 the program has no outputs. Perhaps it's a spectrum analyzer.
- x 1 output 1 is live; outputs 2, 3, and 4 are dead.
- x 2 outputs 1 and 2 are live; outputs 3 and 4 are dead.
- x 3 outputs 1, 2, and 3 are live; output 4 is dead.
- x 4 all of the outputs are live.

If the I/O Identifier is not visible, this means *either* that the program has no inputs or outputs (unlikely, except for a small number of information-only presets) *or* that the program file does not contain I/O Identifier information - this will usually only apply to presets obtained from a DSP4000 or other earlier system.

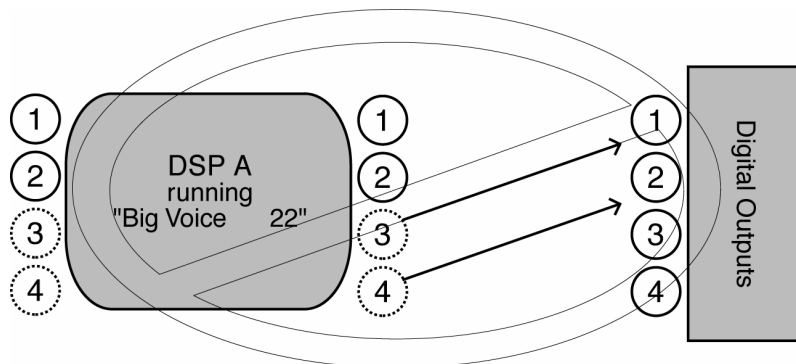
Be mindful of the "I/O Identifiers" when you select your programs and routing configurations. You won't want to make connections to dead inputs or outputs *unless you plan not to use those dead inputs or outputs!* You may find yourself frequently ignoring dead inputs or outputs, especially if you load *quad* routing configurations but only process *stereo* signals. As long as you don't fool yourself into thinking the dead inputs or outputs are passing audio, everything is O.K.! Let's look at a few examples of routing configurations that *rely* on connections to dead inputs and outputs and, because of that reliance, fail to do any business.

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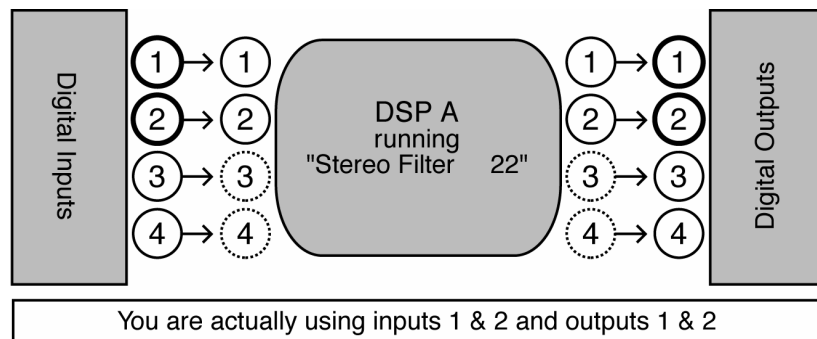
For example, the setup shown to the right is bad news. The inputs to DSP A will never be heard because the program "VocalVerbTwo" doesn't use DSP inputs 3 and 4. Remember, the first digit in its "I/O Identifier," "2," means that only inputs 1 and 2 are live. Inputs 3 and 4 are dead (they're shown as dotted circles in the diagram). You won't hurt Orville by hooking things up this way, but you won't pass audio!



To the right, we have another bad scene. The program "Big Voice" has an "I/O Identifier" of "22." That means that only DSP outputs 1 and 2 are live. Outputs 3 and 4 are dead, but in the block diagram to the right, it is precisely these dead outputs that are being used. Again, you won't hurt Orville by hooking things up this way, but you won't pass audio!



Of course, making a connection to a dead input or output is not *necessarily* a bad thing. You can make "dead connections" as long as you don't fool yourself into thinking that they're actually passing signals. For example, you might want to filter a simple stereo signal.



You'll use digital inputs 1 and 2 and digital outputs 1 and 2. You don't care what's happening on digital inputs 3 and 4 or digital outputs 3 and 4. You load the program "Stereo Filter" with an "I/O Identifier" of "22." For convenience, you load the routing configuration "dual quad 2," which makes connections as shown above. Connections are in fact made to the dead inputs 3 and 4 and the dead outputs 3 and 4, but it doesn't matter in this case. You aren't attempting to pass signals on these "dead connections"! You're only *using* the live inputs 1 and 2 and the live outputs 1 and 2. Again, making a "dead connection" isn't a bad thing as long as you don't fool yourself into thinking that it's actually passing a signal!

The moral? Not all the inputs and outputs on a given DSP are necessarily live. Exactly how many *are* live depends on the program that is being run. To prevent signals from becoming "lost," keep the "I/O Identifier" and its impact on your routing configuration in mind!

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Before we leave this section, we should mention that, although we just asked you to always keep the “I/O Identifier” in mind, you will seldom need to alter a chosen routing configuration to suit a program *in practice*. You’ll find that things tend to work out better than the “bad news” examples above might lead you to believe!

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Controlling Levels

The Levels Meters

Now that you're comfortable routing signals in Orville, we can explore the Level Meters. Once you understand the Level Meters, you can adjust levels along the signal path. There are four individual meters to the left of the display. 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:



- | | |
|-------------|---|
| analog in | measure the level at the analog inputs <i>after</i> the pre A/D gain and after the digital input gain (LEVELS / <code>inputs</code>). |
| digital in | measure the level at the digital inputs <i>after</i> the digital input gain (LEVELS / <code>inputs</code>). |
| machine in | measure the level at the inputs to the currently displayed DSP.* The level shown is <i>before</i> the DSP's input gain (SETUP / <code>dsp x</code>). To measure the level at the inputs to the DSP <i>not</i> currently displayed, press the DSP A/B. |
| machine out | measure the level at the outputs to the currently displayed DSP.* The level shown is <i>after</i> the DSP's output gain (LEVELS / <code>dsp x</code>). To measure the level at the outputs to the DSP <i>not</i> currently displayed, press the DSP A/B key to toggle the display. |
| analog out | measure the level at the analog outputs <i>after</i> the digital output gain but <i>before</i> the post D/A gain (LEVELS / <code>outputs</code>). |
| digital out | measure the level at the digital outputs <i>after</i> the digital output gain (LEVELS / <code>outputs</code>). |

If `Source` is set to `analog in`, the four Level Meters will display the level of analog input 1, analog input 2, analog input 3, and analog input 4. If `Source` is set to `machine in` and the upper left-hand corner of the screen reads "B," the four Level Meters will display the level of DSP B input 1, DSP B input 2, DSP B input 3, and DSP B input 4. The pattern continues, with the four Level Meters displaying the level of the four signals at a point in the signal path selected by `Source`.

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.



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 (-0.06dB) below clipping. Each LED below the second falls off at -3dB per decrement, with the exception of the bottom ones, which light if any signal is present (actually if the signal is above -40dB).

* If the upper left-hand corner of the screen reads "A," the "currently displayed DSP" is DSP A. If the upper left-hand corner of the screen reads "B," the "currently displayed DSP" is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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The Level Meters are useful for two reasons. First, you can use them 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! Second, the Level Meters can be used to troubleshoot routing problems. If, for example, you hear nothing at the output of Orville, and you *think* your signal path goes from the analog inputs to DSP B to DSP A to the digital outputs, you can use the Level Meters to check that signal exists at every point along the way. The point in the path at which the signal "dies" will clue you in to what routing or level parameter has been set incorrectly.

→ Don't forget about the "I/O Identifier" when troubleshooting, see **Programs' Effect on Routing Decisions** on page 48.

Controlling the Level of the Analog and Digital Inputs

Signals come into Orville from the outside world via the four analog inputs and the four digital inputs. Adjust the boost/cut of each of these eight 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 eight inputs independently of the others by pressing the DOWN CURSOR key. *Note: These settings are not saved or loaded with routing configurations in the Routing Storage area.*

A: Filter_0		Input Levels	
analog 1:	0.0 dB	digital 1:	0.0 dB
analog 2:	0.0 dB	digital 2:	0.0 dB
analog 3:	0.0 dB	digital 3:	0.0 dB
analog 4:	0.0 dB	digital 4:	0.0 dB
dsp A		meter	inputs output

The "top" menu page (shown above) makes cuts of 0dB/100dB in the digital domain. So "analog" cuts made on the "top" page are *after* digital conversion. The "bottom" menu page (shown to the right) makes analog boosts/cuts of +30dB/-90dB in the analog domain. Except in rare instances, it is usually preferable to optimize your signal level on the "bottom" menu page, that is *in the analog domain*.

A: Filter_0		Input Levels	
analog 1:	19.0 dB		
analog 2:	19.0 dB		
analog 3:	19.0 dB		
analog 4:	19.0 dB		
dsp A		meter	inputs output

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. The levels shown on the Level Meters are *after* the boost/cut found on the `inputs` menu page.

B: Shortwave Radio		meter setup	
Source:	analog in		
decay time:	0.30 sec		
peak hold:	1.0 sec		
dsp B		meter	inputs output

This means that it is possible to *overdrive* an input to Orville, decrease that overdriven level at the `inputs` page, and *show no clipping* on the Level Meters! To avoid such a situation, it is advisable that you boost/cut the signals coming into Orville at their source. Doing so also results in a better gain structure! The moral? Use the boost/cut 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:

- **Setting Up the External Controllers** on page 66.
- **External Modulation and Trigger Menu Pages** on page 70.
- **Remote Controlling Parameters** on page 83.

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Input Levels, Wet/Dry Ratios, and Output Levels for Each DSP

You can control the input level for each input of each DSP, the wet to dry ratio of each “channel” of each DSP, and the output level for each output of each DSP. All of these settings are saved and loaded with a routing configuration in the Routing Storage area.

→ See **Storing and Loading Routing Configurations** on page 40.

The input level for each input of DSP A is controlled on the right-hand side of the `[dsp A]` menu page in the SETUP area (not to be confused with a menu page of the same name in the LEVELS area!). You can cut the input signal from 0 to -100 dB.

A: GuitarTuner		Dsp A i/p routing	
Analog in 1	-> IN1	A IN1 Gain:	0.0 dB
Analog in 2	-> IN2	A IN2 Gain:	0.0 dB
Analog in 3	-> IN3	A IN3 Gain:	0.0 dB
Analog in 4	-> IN4	A IN4 Gain:	0.0 dB
← clock		inputs	dsp A
			outputs →

By pressing the DOWN CURSOR key to “ungang” the parameters, cuts can be made on single inputs independently of the others.

The input level for each input of DSP B is controlled on the right-hand side of the `[dsp B]` menu page located “below” the `[dsp A]` menu page in the SETUP area. Again, you can cut the input signal from 0 to -100 dB. By pressing the DOWN CURSOR key to “ungang” the parameters, cuts can be made on single inputs independently of the others.

A: GuitarTuner		Dsp B i/p routing	
Analog in 1	-> IN1	B IN1 Gain:	0.0 dB
Analog in 2	-> IN2	B IN2 Gain:	0.0 dB
Analog in 3	-> IN3	B IN3 Gain:	0.0 dB
Analog in 4	-> IN4	B IN4 Gain:	0.0 dB
← clock		inputs	dsp B
			outputs →

To change the wet to dry ratio for each “channel” of DSP A, go to the left-hand side of the `[dsp A]` menu page in the LEVELS area (not to be confused with a menu page of the same name in the SETUP area!). At 100%, the signal coming out of an output is completely processed. At 0%, the signal coming out of an output is identical to the signal applied to the corresponding input. For example, if you set A OUT2 Wet/Dry to 0%, the signal at DSP A output 2 will be the same as the signal at DSP A input 2. A setting between 0% and 100% mixes the processed and input signals as you would expect. Pressing the DOWN CURSOR key “ungangs” the parameters and allows you to control the Wet/Dry ratio of any “channel” independently of the others.

A: m_4ColorDelays		Machine A Levels	
A OUT1 Wet/Dry	100%	A OUT1 Level	0.0dB
A OUT2 Wet/Dry	100%	A OUT2 Level	0.0dB
A OUT3 Wet/Dry	100%	A OUT3 Level	0.0dB
A OUT4 Wet/Dry	100%	A OUT4 Level	0.0dB
dsp A		meter	inputs
			output

Use of the word “dry” may cause some confusion. Normally, if you set an effects box to “dry,” the output of the box is the same as its input. However, the “Wet/Dry” control on Orville is *not* at the box level, it’s at the DSP level. To understand the ramifications of this, pretend we’re sending a signal from the “inputs block” to DSP B. The program loaded on DSP B is a dense reverb and the OUTx Wet/Dry parameters for all four outputs of DSP B are set to 100% (the output is totally processed). Now let’s say you connect all four outputs of DSP B to the inputs of DSP A. That would mean that the signals at the inputs to DSP A are reverberant. Now let’s say you set the OUTx Wet/Dry parameters for all four outputs of DSP A to 0% (not processed at all). DSP A’s outputs would be identical to its inputs: reverberant - not the sort of signal we’d normally call “dry”! The important thing to realize is that the Wet/Dry ratio control for each DSP is *relative to that DSP*. It might be better thought of as a “Wet/Bypass” ratio!

The Wet to Dry ratio control for DSP B can be found on the left-hand side of the `[dsp B]` menu page located “below” the `[dsp A]` menu page in the LEVELS area (not to be confused with a menu page of the same name in the SETUP area!). To access the `[dsp B]` menu page, either press the `[dsp A]` SOFT KEY a second time or press the DSP A/B key. The `[dsp B]` menu page operates just as the `[dsp A]` menu page does.

B: Shortwave Radio		Machine B Levels	
B OUT1 Wet/Dry	100%	B OUT1 Level	0.0dB
B OUT2 Wet/Dry	100%	B OUT2 Level	0.0dB
B OUT3 Wet/Dry	100%	B OUT3 Level	0.0dB
B OUT4 Wet/Dry	100%	B OUT4 Level	0.0dB
dsp B		meter	inputs
			output

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Finally, we can cut the level of each output of each DSP if we so desire. This is done on the left-hand side of the `[dsp A]` or `[dsp B]` menu pages in the LEVELS area (not to be confused with menu pages of the same names in the SETUP area!). The `[dsp B]` menu page is located "below" the `[dsp A]` menu page.

Machine A Levels	
A OUT1 Wet/Dry 100%	A OUT1 Level 0.0dB
A OUT2 Wet/Dry 100%	A OUT2 Level 0.0dB
A OUT3 Wet/Dry 100%	A OUT3 Level 0.0dB
A OUT4 Wet/Dry 100%	A OUT4 Level 0.0dB

`[dsp A]` `[meter]` `[inputs]` `[output]`

Output levels can be cut from 0 to -100 dB. By pressing the DOWN CURSOR key to "un-gang" the parameters, individual output levels can be adjusted independently of the others.

Note that software versions 3.0 and above have improved wet/dry dynamics: in older versions a 50% mix caused the total 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.

→ 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 66.
- **External Modulation and Trigger Menu Pages** on page 70.
- **Remote Controlling Parameters** on page 83.

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 Orville'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.

To adjust the level of the analog outputs, go to the `[output]` menu page in the LEVELS area. The left-hand side of the "top" menu page adjusts the analog outputs -100 to 0 dB *before they are converted to analog signals, i.e. pre-D/A conversion*. Unless you have a good reason for doing otherwise, leave these at zero!

Output Levels	
analog 1: 0.0 dB	digital 1: 0.0 dB
analog 2: 0.0 dB	digital 2: 0.0 dB
analog 3: 0.0 dB	digital 3: 0.0 dB
analog 4: 0.0 dB	digital 4: 0.0 dB

`[dsp A]` `[meter]` `[inputs]` `[outputs]`

A better place to adjust the analog output level -90 to 3 dB is on the "bottom" `[outputs]` menu page in the LEVELS area. These adjustments are made after the D/A conversion. Making your adjustments "post D/A" will generally result in a better gain structure than making them "pre D/A".

Post D/A Gain	
analog 1: -11.0 dB	
analog 2: -11.0 dB	
analog 3: -24.0 dB	
analog 4: -24.0 dB	

`[dsp A]` `[meter]` `[inputs]` `[outputs]`

To adjust the level of the digital outputs, use the right-hand side of the `[outputs]` menu page in the LEVELS area. Adjust the Digital parameter to cut all four digital outputs from 0 to -100 dB.

Output Levels	
analog 1: 0.0 dB	digital 1: -2.5 dB
analog 2: 0.0 dB	digital 2: -2.5 dB
analog 3: 0.0 dB	digital 3: -2.5 dB
analog 4: 0.0 dB	digital 4: -2.5 dB

`[dsp A]` `[meter]` `[inputs]` `[outputs]`

→ 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 66.
- **External Modulation and Trigger Menu Pages** on page 70.
- **Remote Controlling Parameters** on page 83.

→ Note: On 48K-only systems the analog gain can be varied from -100 to 0dB and is before the output metering.

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DIGITAL SETUP

Digital Setup Overview

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

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

Orville sports four digital inputs and four digital outputs. Unlike the analog inputs and outputs, the digital inputs and outputs must be received or sent in pairs.

- digital inputs 1 and 2 are received at a single input jack. That jack is either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack.
- digital inputs 3 and 4 are received at a single AES/EBU input jack.
- digital outputs 1 and 2 are sent out from both the AES/EBU 1/2 output jack and the S/P DIF 1/2 output jack. The format can be set to **either** AES **or** SPDIF for **both** jacks simultaneously.
- digital outputs 3 and 4 are sent out from a single AES/EBU output jack.

Orville 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 word length at the digital outputs can be full 24 bit, dithered to 20 bit, or dithered to 16 bit.

The *system sampling rate* is derived from either an internal clock or an external clock.

The internal clock rates supplied by Orville include 44.1kHz, 48kHz, 88.2kHz, 96kHz, and the rate of an optional user supplied crystal (*note that 32kHz and 44.059kHz are not supplied*). *Unless the sample rate conversion option is on ("bottom" page under [clock] in the SETUP area), you must ensure that any signal at the digital inputs is synchronized to the system clock rate.* The external clock is taken from digital inputs 1/2 and can range from ~30kHz to ~50kHz and from ~54kHz to ~99kHz. *Unless the sample rate conversion option is on ("bottom" page under [clock] in the SETUP area), you must ensure that the signal at digital inputs 3/4 is synchronized to the signal at digital inputs 1/2.* 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

The digital inputs 1/2 are received at either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack. To select between the two, use the DIN 1/2 parameter on the `inputs` menu page in the SETUP area.



The digital outputs 1/2 are sent out at both the AES/EBU 1/2 output jack and the S/P DIF 1/2 output jack. To select between the two *formats*, use the DOUT 1/2 parameter on the "bottom" `format` menu page in the SETUP area. To be clear, signals will be present at both the AES/EBU 1/2 output and the S/P DIF 1/2 output, but they can only be one *format*.



Note: The digital inputs 1/2 need not be assigned to the same protocol as the digital outputs 1/2. In other words, digital inputs 1/2 can be received at the AES/EBU 1/2 input jack and digital outputs 1/2 can be sent via the S/P DIF protocol. Or *vice versa*.

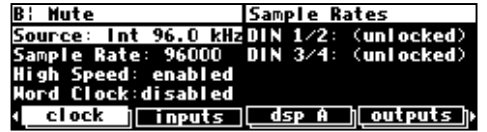
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Sampling Rates

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



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



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. Unless sample rate conversion is on ("bottom" page under **clock** in the SETUP area), *slipping* will occur on any digital inputs unless they are externally locked to one of Orville's digital outputs.



→ See **The Status Of The Digital I/Os When Using The Internal Clock** on page 58.

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 44.1 kHz, Int 48.0 kHz, Int 88.2 kHz (with High Speed: enabled), or Int 96.0 kHz (with High Speed: enabled):

- 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.
- 48 kHz The "professional" rate. The highest reproducible audio frequency is ~22kHz.
- 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 Orville can run. Some programs will be "unloadable" when 88.2 kHz is selected.
- 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 Orville can run.

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

The *actual* value of the system sampling rate can be read 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.

→ See **Miscellaneous Setup Options** on page 92 for other sync options.



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

The sampling rates of the signals at the digital inputs must be equal to the internal clock's rate or sample rate conversion must be turned on under the "bottom" `clock` menu page in the **SETUP** area. The upper right-hand side of the `clock` menu page in the **SETUP** area displays the status of the digital inputs. DIN 1/2 reflects the status of the digital inputs 1/2 (either AES/EBU 1/2 or S/P DIF 1/2 depending on DIN 1/2 on the `inputs` menu page). DIN 3/4 reflects the status of the digital inputs 3/4.



```
A: Amp-u-lation | Sample Rates
Source: Int 48.0 kHz | DIN 1/2: (unlocked)
Sample Rate: 48000 | DIN 3/4: (OK)
High Speed: disabled
Word Clock: disabled
< clock | inputs | dsp A | outputs >
```

The status of the digital inputs will be:

- `slipping` signals are present, but their sampling rate does not correspond with the internal clock's rate. If sample rate conversion hardware is *not* on, digital inputs that are `slipping` may 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. Of course, you can always just turn on the sample rate converter.
- `OK` signals are present, and their sampling rate is locked to the internal clock rate. Everything's groovy.
- `unlocked` no signals are present, the signals' sampling rate is very unstable, or something is dreadfully wrong with the signals.

If the words `slipping` or `unlocked` are in parentheses (as shown above), this means that the respective inputs are not *routed* and that the indication can be ignored. The sampling rate at the digital outputs will be the same as the system sampling rate, and A/D and D/A conversion will be done at the system sampling rate.

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

- 96 kHz
- 88.2
- 48
- 44.1
- EXT

The "System Sampling Rate and External Sync Indicator" is the box of five LEDs immediately to the left of the display. The top four 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.

The bottom LED, EXT, has four possible states:

- **Not lit at all:** When the bottom LED is not lit at all, none of the digital inputs are *routed*.
- **Solidly lit:** When the bottom LED is solidly lit, the sampling rates of all *routed* digital inputs are locked to the internal clock rate.
- **Blinking regularly:** When the bottom LED is blinking *regularly*, at least one (and maybe more than one) *routed* digital input is unlocked. Use the right-hand side of the `clock` menu page in the **SETUP** area to see which digital inputs are in fact unlocked.
- **Blinking irregularly:** When the bottom LED is blinking *irregularly*, at least one (and maybe more than one) *routed* digital input is "slipping" relative to the internal clock. Use the right-hand side of the `clock` menu page in the **SETUP** area to see which digital inputs are in fact slipping.



Digital inputs that are not routed (i.e., are not connected to DSP A, DSP B, or the "outputs block") will not affect the status of the EXT LED.

→ See **Signal Flow Inside Orville** on page 38.

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. The external clock's sampling rate is derived from digital inputs 1/2 or the word clock input. Unless sample rate conversion is on ("bottom" `clock` menu page in the **SETUP** area), you must ensure that digital inputs 3/4, if used, are synchronized to digital inputs 1/2 or the word clock input. Similarly, if you only use a single digital input, it must connect to 1/2.

Note: If digital inputs 1/2 are "unlocked" (not connected to a valid digital source), the external clock will be **invalid** unless you're using the word clock input. If the external clock is invalid, the system sampling rate will revert to the last valid *internal* clock rate.

If your hardware configuration supports it, an external Word Clock input may also be used as an external clock source. You will have to enable this feature before you can select it.

See Miscellaneous Setup Options on page 92 to enable/disable Word Clock input.

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Selecting The External Clock

The external clock is derived from digital inputs 1/2 or the word clock input. 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 AES/EBU 1/2 or S/P DIF 1/2 (which you can select depends on which you selected under the `inputs` menu page). The system sampling rate will now be the sampling rate of digital inputs 1/2.

Remember that digital inputs 1/2 are "taken" from either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack. Use the `DIN 1/2` parameter `inputs` menu page to switch between the two.

A: Timeout Spore	Sample Rates
Source: AES/EBU 1/2	DIN 1/2: (OK)
Sample Rate: 47999	DIN 3/4: (unlocked)
High Speed: disabled	
Word Clock: disabled	
<code>clock</code>	<code>inputs</code> <code>dsp A</code> <code>outputs</code>

Alternatively, you can enable the Word Clock parameter and select WORDCLK as the external clock source.

B: Demodelay	Sample Rates
Source: WORDCLK	DIN 1/2: (OK)
Sample Rate: 48000	DIN 3/4: (unlocked)
High Speed: disabled	
Word Clock: enabled	
<code>clock</code>	<code>inputs</code> <code>dsp B</code> <code>outputs</code>

The rate of the external clock is displayed in the "Sample Rate: xxxxx" field. In the example shown two screens above, the *actual* frequency of the external signal is 47999 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 57 for information on speed modes.

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

The right-hand side of the `clock` menu page in the SETUP area displays the status of the digital inputs. `DIN 1/2` reflects the status of the digital inputs 1/2 (either the AES/EBU 1/2 input jack or the S/P DIF 1/2 input jack depending on `IN 1/2` on the `inputs` menu page). `DIN 3/4` reflects the status of the digital inputs 3/4. Unless sample rate conversion is on ("bottom" `clock` menu page in the SETUP area), you must ensure that digital inputs 3/4 are synchronized to digital inputs 1/2.

A: Timeout Spore	Sample Rates
Source: AES/EBU 1/2	DIN 1/2: (OK)
Sample Rate: 47999	DIN 3/4: (unlocked)
High Speed: disabled	
Word Clock: disabled	
<code>clock</code>	<code>inputs</code> <code>dsp A</code> <code>outputs</code>

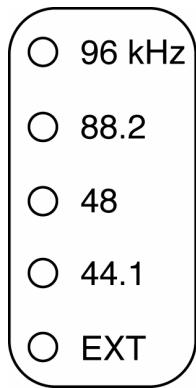
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The status of the digital inputs will be:

slipping	DIN 1/2 will read <code>slipping</code> if its sampling frequency changes suddenly or if it is unstable. For DIN 3/4, this means that signals are present, but they are not synchronized with DIN 1/2. If sample rate conversion is <i>not</i> on, <code>slipping</code> digital inputs 3/4 will suffer distortion. The greater the discrepancy between the sampling rate of digital inputs 1/2 and the sampling rate of digital inputs 3/4, the greater the distortion.
OK	For DIN 1/2, this means that the sampling rate is stable. For DIN 3/4, this means that signals are present, and synchronized to digital inputs 1/2.
unlocked	no signals are present, the signals' sampling rate is changing suddenly, the signals' sampling rate is very unstable, or something is dreadfully wrong with the signals.

The sampling rate at the digital outputs will be the same as the sampling rate of digital inputs 1/2 (which is the system sampling rate in *external*). A/D and D/A conversion will be done at the sampling rate of digital inputs 1/2 (which is the system sampling rate in *external*).

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



The "System Sampling Rate and External Sync Indicator" is the box of five LEDs immediately to the left of the display. The top four 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*).

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



The bottom LED, EXT, has two possible states:

- **Solidly lit:** When the bottom LED is solidly lit, digital inputs 1/2 are locked and all is right with the world.
- **Blinking regularly:** When the bottom LED is blinking regularly, digital inputs 1/2 are *not locked*. Because digital inputs 1/2 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.

Notice that when synched to the external clock, the EXT LED has nothing to do with digital inputs 3/4, nor does it have anything to do with which digital inputs are routed and which aren't (*unlike internal clock mode*).

- To see the status of digital inputs 3/4, look to the DIN 3/4 field on the [audio] menu page in the SETUP area.
- To check which digital inputs are routed, consult the routing menu pages discussed in **Signal Flow Inside Orville** on page 38.

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Sample Rate Conversion (SRC)

In the absence of sample rate conversion (SRC), you need to make sure that any digital inputs are synchronized to the system sampling rate. Of course, when you select external synchronization, digital inputs 1/2 *are* the system sampling rate. In this case you only need to worry about digital input 3/4.

If for whatever reason you cannot synchronize either digital input to the system sampling rate, use sample rate conversion (SRC).

The sample rate conversion page is the "bottom" menu page under `clock` in the `SETUP` area. By turning SRC Mode on for the

Timeout Spore	Sample Rate Conv
SRC Mode 1/2: on	Status 1/2: OK
SRC Mode 3/4: on	Status 3/4: OK
	Input SR 1/2: 48000
	Input SR 3/4: 44100

◀ clock | inputs | dsp A | outputs ▶

appropriate digital input, Orville will adjust the input sampling rate to match the system sampling rate. The sample rate before conversion is displayed in the lower right corner of the screen.

The sample rate conversion algorithm is quite good and will generate few, if any, noticeable artifacts. Nevertheless, if you can synchronize the input devices to the Orville without using sample rate conversion, the end result will be just a little better.

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Word Length (Bits)

Input Word Length

As was mentioned in the introduction to this section, Orville assumes that the signals at the digital inputs are all 24 bit. Things work out regardless of the actual word length of the input signals because (for example) the 16 bits in a 16 bit signal correspond to the 16 “most significant” bits in a 24 bit signal. The 8 “least significant” bits are left “blank,” to be filled in by subsequent processing.

If, however, the device sending Orville digital signals supports the protocol, you can see the word length at the inputs to Orville. Go to the `format` menu page in the **SETUP** area.

The top two fields on the upper left-hand side of the screen display the word length. The top field represents the word length at digital inputs 1/2 and the second field from the top represents the word length at digital inputs 3/4.

A:	GuitarTuner	Dig	I/O	Format	1
in:	24	[	BITS	1/2	] out: 24
in:	**	[	BITS	3/4	] out: 24
in:	AES	[	SCMS	1/2	] out: copy OK
in:	off	[	EMPH	1/2	] out: off
◀ format tempo timer pedals ▶					

If the input bits are unknown, the field reads, quite logically, “unknown.” If a digital input is unlocked (not valid or not connected), the field will read “**.”

Output Word Length

If the device to which you are outputting digital signals uses fewer than 24 bits, you can *dither* Orville’s output to 20 bits or 16 bits. Use the top two parameters on the upper right-hand side of the `format` menu page in the **SETUP** area. Your choices for output bits are, appropriately, 16, 20, or 24. The output word length you select for digital outputs 1/2 can differ from the output word length you select for digital outputs 3/4.

A:	GuitarTuner	Dig	I/O	Format	1
in:	24	[	BITS	1/2	] out: 24
in:	**	[	BITS	3/4	] out: 24
in:	AES	[	SCMS	1/2	] out: copy OK
in:	off	[	EMPH	1/2	] out: off
◀ format tempo timer pedals ▶					

Although you can leave these parameters set to 24 regardless of what the word length supported by the devices you are sending signals to is, assigning them with care will increase the quality of the result. Also, if a device supports a word length that “falls in the crack,” choose the next largest word length in Orville. For example, if your sampler were 18 bit, you would set the output of Orville to 20 bit, *not 16 bit*.

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BYPASSING AND MUTING

Sometimes you'll find it necessary to bypass Orville. A few bypassing options exist in the **BYPASS** area. You can get to this by pressing the **BYPASS** key. Alternatively, pressing and holding the **BYPASS** key for a second will toggle the `system` bypass mode, returning to the previous screen. There are two "levels" of bypass, `system` and `machine`. `System` refers to Orville as a whole, whereas `machine` refers to each DSP.



System Bypass

The three options that exist for `system` bypass are:

`rly bypass` "Hardwires" each input to its corresponding output, i.e., analog input 1 is connected to analog output 1, digital input 3 is connected to digital output 3, etc. This may well NOT be the same as the current routed configuration. For example, if Analog in 1 is routed to Digital out 3, this will differ from the connection when bypassed.

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

`dsp bypass` Makes each output of each DSP the same as its corresponding input. E.g. - DSP A's output 2 will be the same as DSP A's input 2, DSP B's output 4 will be the same as DSP B's input 4, etc. The routing configuration still applies. *This is the same as setting all the `OUTx Wet/Dry` parameters on the `[dsp A]` and `[dsp B]` menu pages in the **LEVELS** area to 0%, except that the output levels cannot be changed.*

`mute` Mutes all the outputs.

Put Orville into `system` bypass mode either by pressing the `<system>` SOFT KEY or by pressing and holding the **BYPASS** key for one second. Once Orville is in `system` bypass mode, the Bypass Status LEDs blink, and the `<bypass A>` and `<bypass B>` menu keys are no longer available.



To get Orville out of `system` bypass mode, either press the `<system>` SOFT KEY or press and hold the **BYPASS** key for one second.

→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 92.

→ See **CAPTURE** on page 76 to see how to remote control the bypass functions.

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Machine Bypass

The two options that exist for machine bypass are:

- dsp bypass** Makes each output of the bypassed DSP the same as its corresponding input. The routing configuration still applies. *This is the same as setting all the `OUTx Wet/Dry` parameters on the `[dsp x]` menu page in the **LEVELS** area to 0%, except that the output levels cannot be changed.*
- mute** Mutes the outputs of the bypassed DSP. The routing configuration still applies.

Put Orville into machine bypass mode by pressing either the `<bypass A>` SOFT KEY or the `<bypass B>` SOFT KEY. As you'd expect, pressing the `<bypass A>` SOFT KEY bypasses DSP A, and pressing the `<bypass B>` SOFT KEY bypasses DSP B. The corresponding Bypass Status LED will light when a DSP is bypassed.



To “un”-bypass a DSP, press its `<bypass x>` SOFT KEY again. Its corresponding Bypass Status LED will grow dark. . .

→See **CAPTURE** on page 76 to see how to remote control the bypass functions.

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EXTERNAL CONTROLLERS

External controllers are inputs to Orville that allow the modulation of parameters from a source outside Orville. 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 66.
- **External Modulation and Trigger Menu Pages** on page 70.
- **Remote Controlling Parameters** on page 83.

In addition, external controllers can be used to advance through programs.

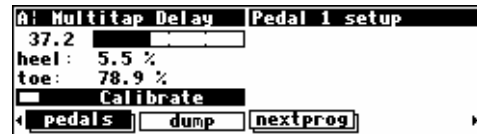
→ See **Loading a Program Remotely** on page 82.

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 Orville. 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.



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MIDI Setup

In Orville, MIDI can be used:

- with programs that explicitly call for MIDI signals. For example, some programs in Orville 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 Orville (including input and output levels).
- to change programs via MIDI program change messages.
→ See **Loading A Program Via A MIDI Program Change Message** on page 82.
- to advance to the next program or select the previous program.
→ See **Triggering the Next or Previous Program To Load** on page 83.

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, see the Programming Manual.

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

If the parameter omni mode is set to on, the current bank will be changed on the current DSP.

Alternatively, if omni mode is off, a MIDI Controller #0 message sent using the base channel will cause the current bank to be changed in DSP A, while a MIDI Controller #0 message sent using the channel one greater than the base channel will cause the current bank to be changed in DSP B.

The system will be switched to A or B as appropriate, just as if the DSP A/B button were pressed.

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.

All of these parameters are found on the “second” midi/ext menu page in the **SETUP** area.

Note: To aid in troubleshooting, you can use the BUSY LED as a “MIDI chaser.”

- to load programs in sequence.
→ See **Triggering the Next or Previous Program To Load** on page 83.
- to “dump” information from one Orville to another or to an external storage device.
→ See **Dumping Data and Receiving Data Dumps** on page 95.
- to control one Orville with another.
→ See **Controlling One Orville from Another Orville** on page 96.
- to record parameter changes on a MIDI sequencer for subsequent playback.
→ See **Sequencing With MIDI** on page 97.

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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.
→ See **Setting Up the Serial Port** on page 94.
- `program load` This determines whether Orville will accept and obey MIDI program change messages.
- `sequence out` If set to `old` or `new`, 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 mix-downs. Simply play back the recorded MIDI sequence at Orville’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 Orville loop back into Orville without delay, digital demons will unleash a raging fury inside your helpless Orville. 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 97.
If you’re recording a fresh `sequence out`, use `new`. Your Orville will send messages in a more robust ASCII format than the `old` protocol. Select `old` if your Orville will be responding to a sequence recorded in the `old` protocol or if you anticipate reading the sequencer with an older Orville in the future.
- `system exclusive` If set to `on`, then any system exclusive message that is received by Orville will be accepted and dutifully obeyed. If set to `off`, then all system exclusive messages will be ignored. This switch does not prevent Orville 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 Orville!*
- `device ID` All system exclusive messages to and from *this* Orville will have *this* `device ID`. If you’re using more than one Orville, 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* Orville. Normally, the `device ID` is left at 1, the factory default. You can control one Orville from another by matching their `device IDs`.
→ See **Controlling One Orville from Another Orville** on page 96.

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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 Orville.
omni mode	If this is <code>on</code> , then a MIDI message on <i>any</i> channel is accepted and dutifully obeyed by <i>every</i> MIDI message recipient in Orville. This keeps things simple in simple setups. If this is <code>off</code> , then every MIDI recipient in Orville specifies which MIDI channel (offset from the <code>base channel</code>) it will accept messages on.
note mode	Orville allows selection of <code>mono</code> and <code>poly</code> mode. <code>Poly</code> means one channel has all the notes (keyboards). <code>Mono</code> means each channel plays only one note, but you have multiple channels (MIDI guitars, wind controllers).
pressure	This parameter affects project deadlines. Additionally, if this parameter is set to <code>channel</code> , then the last changed MIDI aftertouch message on a given channel affects all the notes played on that channel. If it’s set to <code>key</code> , 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 Orville, 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 Orville 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.

→ See **Setting Up the Serial Port** on page 94.

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.

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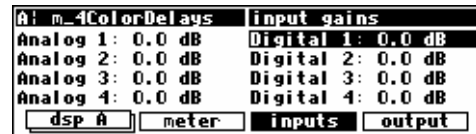
External Modulation and Trigger Menu Pages

Many aspects of Orville'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 66 to set these controllers up). External "modulation" involves altering a parameter value over a *range* of values. For example, you could modulate a delay from 5 milliseconds to 25 milliseconds. At different points in time, the delay will be 5 milliseconds, 25 milliseconds, *and all of the values in-between*. An external "trigger," on the other hand, has only two states. It is *not* continuous. For example, you could trigger a gate to open. The gate can be either open or closed. A trigger switches the parameter from one state to the other.

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, all you're really doing on these menu pages is selecting the external controller that will modulate or trigger a parameter. 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 the case of external modulation menu pages, 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.



With the cursor highlighting Digital 1 on the `inputs` menu page in the LEVELS area, press and hold the **SELECT** key until the external modulation menu page shown to the right appears.



The "SELECT key trick" is how you "remote control" any parameter in Orville and is discussed in depth on page 83. 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!).

→ See **Remote Controlling Parameters** on page 83 if you're really curious.

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!*



"Manually" Selecting an External Controller For Modulation

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.

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mid	This isn't really a <i>modulator</i> (it doesn't evolve through time). It pins the parameter at its middle modulation value.
low	This isn't really a <i>modulator</i> (it doesn't evolve through time). It pins the parameter at its lowest modulation value.
assign 1, 2, ..., 8, Trig 1&2	These are "placeholders" that are assigned to <i>actual</i> external modulators on the <code>external</code> 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 79.
pedal 1 & 2	The input from the pedals at the rear panel foot pedal jacks 1 & 2. These jacks are setup on the <code>pedals</code> menu page in the SETUP area. → See Foot Pedals 1 and 2 on page 66 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 <i>any</i> 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: <ul style="list-style-type: none">• "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. Alternatively, the same results may be obtained by pressing the first two switches simultaneously to simulate the third switch. (See drawing on page 74.) In "3 switch" mode: <ul style="list-style-type: none">• "tip" is high when a switch connected between tip and sleeve is closed and the third switch is open.• "ring" is high when a switch connected between ring and sleeve is closed and the third switch is open.• "tip&ring" is high when the third switch is closed.
mod wheel	MIDI control message 1 - typically assigned to the mod wheel on a MIDI keyboard.
chan pressure	MIDI channel pressure message.
pitch wheel	MIDI pitch bend message.
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.
portamento	MIDI control message 5 - typically assigned to portamento.

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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, 2, 3, and 4	MIDI control messages 16, 17, 18, and 19.
MIDI double	Allows selection of any MIDI control number with very fine quantization. Input range is 0 to 16383. A third parameter appears, <i>con</i> , which selects the controller number to be used. <i>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.</i>
MIDI single	Allows selection of any MIDI control number with coarse quantization. Input range is 0 to 127. A third parameter appears, <i>con</i> , which selects the controller number to be used.
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.

"Manually" Selecting the External Controller For Triggers

External trigger menu pages are less common than external modulation menu pages. A good example of one is the `nextprog` menu page in the **SETUP** area (you may have to press the **SETUP** key several times to find it). As on external modulation menu pages, mode selects the external controller that will do the triggering. Our options are:



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off

No triggering at all.

trig 1 & 2

These are “placeholders” that are assigned to *actual* external controllers on the 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 79.

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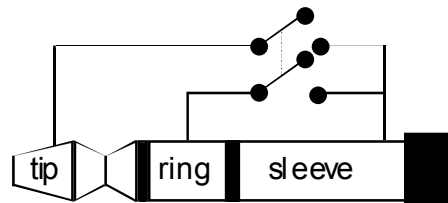
tip 1 & 2, ring 1 & 2, and tip & ring 1 & 2

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.

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.

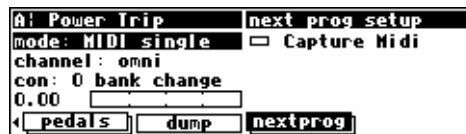
general 5, 6, 7, and 8 Triggers when a general 5, 6, 7, or 8 MIDI control message is received with value = 1.

note on Triggers when a MIDI note message is received.


MIDI program Triggers when a MIDI program change message is received.

mod 1, 2, 3, and 4 Triggers when the *mod 1, 2, 3, or 4* parameter passes 50%.

MIDI single Allows selection of any single byte MIDI control number. When a control value of 50% of full range is received, a trigger will occur. The trigger is reset when a value of less than 50% is received. A third parameter appears, con, which selects the controller number to be used.



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MIDI double	Allows selection of any double byte MIDI control number. When a control value of 50% of full range is received, a trigger will occur. The trigger is reset when a value of less than 50% is received. A third parameter appears, con, which selects the controller number to be used.	
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

Parameters Common to Both External Modulation and External Trigger Menu Pages.

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.



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



$$10 + 12 = 22$$

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

SIX!

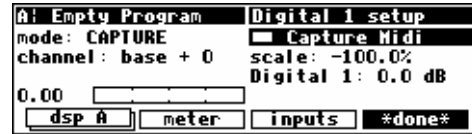
It's worth noting that MIDI commands are often sent on a MIDI connection only if the command being sent differs from the last command sent. Between the occasional command messages are data messages. A data message pertains to the last sent command message. These are known as "Running Status." You could send a MIDI command message to Orville 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

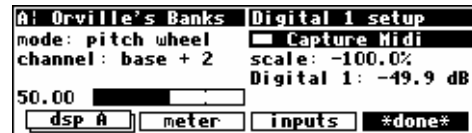
As opposed to “manually” selecting a MIDI controller, along with its proper channel and control number, a feature exists that “captures” the first MIDI message sent to Orville and uses it as the external controller. This works on both external modulation and external trigger menu pages.

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 Orville in “Capture” mode. The mode parameter reads “CAPTURE.”



The next type of MIDI message received by Orville 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.)



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 Orville 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 Orville at the MIDI In port cause the BUSY LED to flash. If you're trying to send MIDI messages to Orville, 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 Orville!

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 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.



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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.



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.



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



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



Let's say we want to modulate it with the external controller "mod wheel on MIDI channel 3." We could either directly adjust the



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mode and channel parameters, or we could use the Capture Midi feature to select it. (Check **omni mode** on page 69.)

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.



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 32500.)



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



After a few more trials, we zero in on 0.62% for scale and hit our target. To escape from this page, press the ***done*** SOFT KEY.



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

$$(\text{max-parameter-value} - \text{min-parameter-value}) / \text{full-range} = \text{scale}$$

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



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



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.



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.



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With scale set to 100.0%, we advance the mod wheel. We can see that the *full-range* of this parameter is 32247 mS.



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



Recall our equation:

$$(\text{max-parameter-value} - \text{min-parameter-value}) / \text{full-range} = \text{scale}$$

Plug in our values:

$$(300.0 - 100.0) / 32247 = 0.006202$$

In other words, we need to set scale to 0.6202 %. Notice that the display then reads 0.62%. Although you don't always see all of the digits you type in Orville, it still stores six significant digits!



That completes our review of the external modulation menu page. After having investigated all of the parameters on this menu page, it should be mentioned that you will find “stripped down” versions of it scattered throughout Orville.

For example, the program “Ext Pitch 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 that remains is to choose an external controller, and that is done in the same manner as discussed above.



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.*

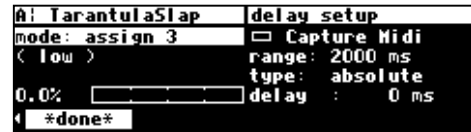
These “placeholders” are selected as the mode on external modulation or trigger menu pages littered throughout Orville.



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For example, *assign 3* can be assigned here. . .

And here. . .



And here. . .



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* 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 mod wheel!

Moreover, the value in parentheses above, (*low*), would change to (*mod wheel*).

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 **External Modulation and Trigger Menu Pages** on page 70, except that there is no *scale* parameter. This makes sense because a single



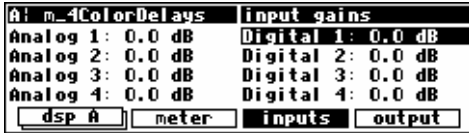
“placeholder” can be selected to externally control a multitude of parameters. “Scaling” is done on the external modulation or trigger menu pages littered throughout Orville that have as their mode the “placeholder.”

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*.

Here are the benefits: If you take Orville 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 Orville 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.

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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.

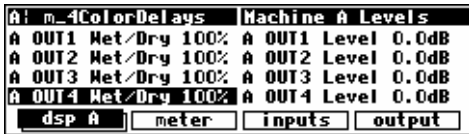


Let's highlight Digital 1 on the `inputs` menu page in the LEVELS area. Remember to press the DOWN CURSOR key to "ungang" parameters.

Press and hold 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 92.

Set the mode to assign 3 and range to -100.0dB.



Next, let's highlight A OUT4 Wet/Dry on the `dsp A` menu page in the LEVELS area. Remember to press the DOWN CURSOR key to "ungang" parameters.

Press and hold the **SELECT** key for one second. Set the mode to assign 3 and range to -100.0%.

→ To change the "one second hold time," see *Miscellaneous Setup Options* on page 92.



At this point, we've assigned the "placeholder" `mod 3` to modulate both Digital 1 and A OUT4 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.



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).



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Now, when you move the mod wheel on MIDI channel "base + 4," both Digital 1 and A OUT4 Wet/Dry are modulated!
(Select the MIDI base channel on the [midi] menu page in the SETUP area.)



The very first time you switch on Orville, 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.



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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 "Delay_M" (found in the "Delays" bank).



With the cursor in place, press and hold 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.



This is the same menu page we discussed *ad nauseam* in **External Modulation and Trigger Menu Pages** on page 70. We won't rehash it here.

→ To change the "hold time," see **Miscellaneous Setup Options** on page 92.

We can exit this screen by pressing the ***done*** SOFT KEY. You may notice that Orville 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 `<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 83, and **Updating a Program** on page 84.

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.



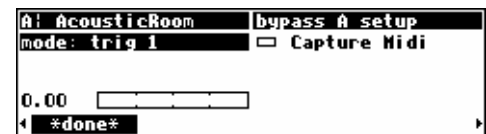
The underline blinks to add an element of fun and excitement to Orville's display and to cheer you up when you're feeling glum. You can return to the remote control menu page by highlighting `delay` and holding the SELECT key again. If you change the mode to `off` on the "remote control" menu page, `delay` will no longer be underlined and nothing will blink.

Remote Controlling Triggers

As we mentioned before, some soft keys are known as *triggers* because pressing them causes an action to happen, as opposed to displaying a menu page. An example of this is shown to the right on the BYPASS screen. See **Bypassing and Muting** on page 64 for more information on this screen. The three left-hand keys are *triggers*, the square right-hand key is a *menu page*.



To remote one of the triggers, press and hold the soft key for about a second. This will then bring up the remote control screen described above, allowing you to choose how you want to control it. The flashing underbar (as in `bypass A`, above) indicates that this key is remotely controlled. If you change the mode to `off` on the "remote control" menu page, the underline will, of course, go away.



→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 92.

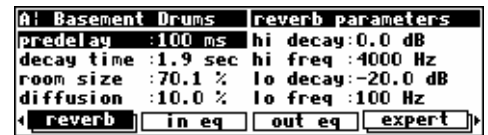
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MIDI Groups

The use of "MIDI groups" allows an alternative way to control Orville 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 Orville has been told to respond to this group, these controllers will correspond to the parameters on Orville's screen. This allows a multi-controller such as the Peavey PC1600 to control Orville 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:

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

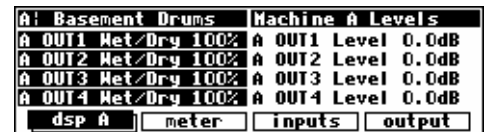


Each parameter would be controlled over its full range - for example, in this preset *lo freq* has a minimum value of 10 (Hz) and a maximum value of 1000 (Hz). This means that the minimum MIDI value (0) would give you 10 (Hz) and the maximum MIDI value (127) would give you 1000 (Hz.)

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 DSP A Levels, the following would apply:

70: Wet/Dry 1
71: Wet/Dry 2
72: Wet/Dry 3
73: Wet/Dry 4
74: Level 1
75: Level 2
76: Level 3
77: Level 4



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 key in the SETUP/MIDI 'stack' controls the MIDI group. This operates just like any of Orville's other controller screens, with some added features:



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- 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 76 for more on MIDI capture.**
- 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 `sticky` is off, 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 `sticky` to on.
- If `sticky` is on, 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.



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PROGRAM LOAD, SAVE, DELETE, ETC.

"...Orville is like a jungle gym for sine waves..."

-Anonymous

Programs are the "algorithms" used by the DSPs to process signals. Programs are stored in Orville much like files are stored on your computer's hard drive. Instead of using a hard drive, however, Orville uses RAM memory, either internally or on a card. *(A battery preserves the memory when Orville 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.

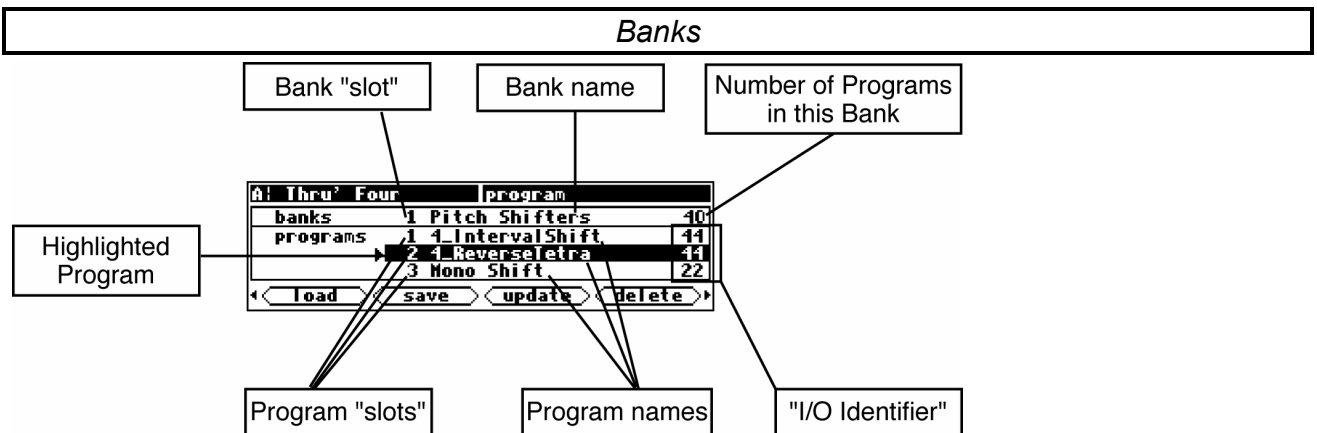
When you want to use one of Orville's programs, you "load" it. There are always two and only two programs that are "loaded" (or "running") on Orville: one on DSP A and the other on DSP B. *(Of course, if you want to, you can run the same program on both DSPs. There will be two "instances" of that program running, and the parameter values set for one will not affect those of the other.)* All of the programs in memory are available to either DSP *(except for "large sampler programs" and some "long delay" programs - these can only be loaded on DSP A).*

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 Orville).*



A "bank" is like a manila folder for programs. Instead of just giving you a pile of programs from which to load, Orville'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 "Reverbs - Rooms," and a bank of "Vintage Emulation ." To scroll through the available banks, use the LEFT and RIGHT CURSOR keys.

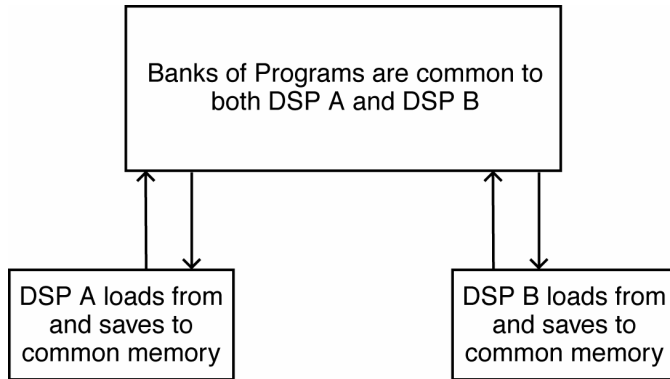
To access banks on a Memory Card, simply scroll past all of the internal banks. Alternatively, you can type the "minus" key on the NUMERIC KEYPAD and then the number of the Memory Card bank you want (pressing ENT when you're done). Notice that a

A: Timbre Synth F=2 | program	
banks	C 6 Synth 26
programs	0 FM SH U22
	1 FM Sequence U22
	2 Timbre Synth F=2^n U22
◀ load ▶ save ▶ update ▶ delete ▶	

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“C” appears in the “banks” field to indicate that the displayed bank is on the Memory Card.

→ See **Memory Cards** on page 36.



The banks in Orville and the programs stored in them are common to both DSP A and DSP B.

Creating a New Bank or Renaming an Old Bank

As far as Orville 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 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 this amuses you, but not the factory programs!



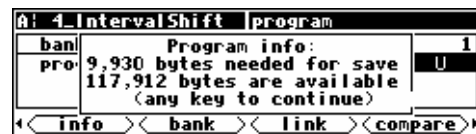
→ See **Entering or Changing Text** on page 23.

The “Size” of a Program and Its Ramifications for Storage

Finite things overrun the world we inhabit. There is a limit to the space available in Orville 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 for storage. In the worst case that means that 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 36.

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. The program to which this information pertains is the one running on the currently displayed DSP.* On the screen to the right, the program running on DSP A, “4_IntervalShift,” requires 9,930



* If the upper left-hand corner of the screen reads “A,” the “currently displayed DSP” is DSP A. If the upper left-hand corner of

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bytes of storage space (a "kilobyte" is 1024 bytes). If the bank selected 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 and scrolling through programs with the UP and DOWN CURSOR keys. When the triangle cursor is next to the program you want to load, press the SELECT key, the <load> SOFT KEY, or the ENT key.

A: AcousticRoom	program
banks	8 Delays - Modulated (45)
programs	11 Auto Tape Flanger f 22
	▶ 12 Band Flanger f 24
	13 Bpm Modelays f 44
◀ load ▶ save ▶ update ▶ delete ▶	

→ This is described in excruciating detail in *Using the Cursor Keys and the KNOB in the PROGRAM and Routing Storage Areas* on page 21.



It's important to note that the program will be loaded into the currently displayed DSP.* If you want to load the program into the DSP *not* currently displayed, you need to press the DSP A/B key.

! 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 "Band Flanger" indicates the unavailability, the "F!" (for Fast!) tells you why.

A: AcousticRoom	program
banks	8 Delays - Modulated (45)
programs	11 Auto Tape Flanger f 22
	▶ 12 Band Flanger f F!
	13 Bpm Modelays f 44
◀ load ▶ save ▶ update ▶ delete ▶	

→ See: **Sampling Rates** on Page 57 for more information on speed modes.

! NOTE ! Programs using the (large) *Sampler* and *Longdelay* modules are be unavailable for loading on DSP B. In the screen on the right, the line through "Digital Timesqueeze" indicates the unavailability, the "B!" (for DSP B!) tells you why.

B: Orville's Banks	program
banks	52 Sampler - Large (19)
programs	▶ 10 Digital Timesqueeze? B!
	11 HiBitTrig Reverse f B!
	12 Multi Trigger f B!
◀ info ▶ bank ▶ link ▶ compare ▶	

→ See: the **Programming Manual** for information on the *Sampler* and *Longdelay* modules.

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 Orville, 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.

B: Orville's Banks	program
banks	0 Favorites (9)
programs	13 ChromaticTuner fL 22
	▶ 14 BasicRoom fL 24
	15 Backward Garden 3 L 22
◀ info ▶ bank ▶ link ▶ compare ▶	

→ See: **"Linking" Programs** on page 85 for more information on *links*.

Miscellaneous Setup Options on page 92 to change the number of "favorites" displayed.

Once you're comfortable with accessing programs as described in Using the Cursor Keys and the KNOB in the PROGRAM and Routing Storage Areas on page 21, you should be let in on a few secrets: Using the UP CURSOR key to go past the first program in a bank will take you to the last program in the previous bank. Similarly, using the DOWN CURSOR key to go past the last program in a bank will take you to the first program in the next bank. Also, if you know what bank number you want to go to, simply position the cursor over the bank field and type the bank number you

the screen reads "B," the "currently displayed DSP" is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

* If the upper left-hand corner of the screen reads "A," the "currently displayed DSP" is DSP A. If the upper left-hand corner of the screen reads "B," the "currently displayed DSP" is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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want with the **NUMERIC KEYPAD** (pressing **ENT** when you're done). Similarly, if you know what program number you want in the current bank, simply position the cursor in the program field and type the program number you want with the **NUMERIC KEYPAD** (pressing **ENT** when you're done).

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 Orville 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

Orville 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, which can be different for each DSP. It is usually the one from which the last program on each DSP was loaded.

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**.

If the parameter **omni mode** is set to **on**, the program will be loaded into the current DSP.

Alternatively, if **omni mode** is off, a MIDI Program Change message sent using the **base channel** will cause the program to be loaded in DSP A, while a MIDI Program Change message sent using the channel one greater than the **base channel** will cause the program to be loaded in DSP B.

The system will be switched to A or B as appropriate, just as if the **DSP A/B** button were pressed.

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.

All of these parameters are found on the "second" **midi/ext** menu page in the **SETUP** area.

*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 Orville at the MIDI In port cause the **BUSY LED** to flash. If you're trying to send MIDI Program Change messages to Orville, 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 Orville!*

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/ext** menu page in the **SETUP** area must be set to **enabled**.

If the parameter **omni mode** is set to **on**, the current bank will be changed on the current DSP.

Alternatively, if **omni mode** is off, a MIDI Controller #0 message sent using the **base channel** will cause the current bank to be changed in DSP A, while a MIDI Controller #0 message sent using the channel one greater than the **base channel** will cause the current bank to be changed in DSP B.

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The system will be switched to A or B as appropriate, just as if the **DSP A/B** button were pressed.

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.

All of these parameters are found on the “second” **midi/ext** menu page in the **SETUP** area.

*Note: To aid in troubleshooting, you can use the **BUSY LED** as a “MIDI chaser.”*

Triggering the Next or Previous Program To Load

Orville 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. This will act upon the currently displayed DSP*.

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 70.



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 lowest program in the bank. Similarly, if the currently loaded program is the “lowest” program in the bank, a “previous” program trigger will load the highest 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 do want to overwrite the original version of a saved program, use the **<update>** SOFT KEY discussed below.

The program you are saving is the one running on the currently displayed DSP*. *If you would like to save the program running on the DSP not currently displayed, press the **DSP A/B** key before pressing **<save>**.*

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.



* If the upper left-hand corner of the screen reads “A,” the “currently displayed DSP” is DSP A, while if the upper left-hand corner of the screen reads “B,” the “currently displayed DSP” is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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→ see **Entering or Changing Text** on page 23.

Copying Programs

To copy a program, simply load it into one of the DSPs 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

Like <save>, when you press the <update> SOFT KEY, you are updating the program running on the currently displayed DSP*. *If you want to update the program running on the DSP not currently displayed, press the DSP A/B key.*

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!

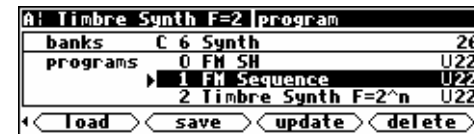


Deleting a Program

Because there is a finite amount of storage space in Orville 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 either DSP.

On the screen to the right, if we were to press the <delete> SOFT KEY, we would be deleting the program “FM Sequence.” (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



* If the upper left-hand corner of the screen reads “A,” the “currently displayed DSP” is DSP A. If the upper left-hand corner of the screen reads “B,” the “currently displayed DSP” is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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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. . .



“Linking” Programs

(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 Orville, 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.”

→ You can read about remotely loading programs in **Loading a Program Remotely** on page 82.

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 Orville 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.”



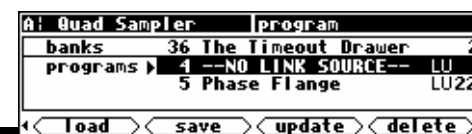
Press the <link> SOFT KEY to reveal the pop-up menu shown on the right. Find the program you want to link to with the second and third lines, “bank:” and “program:” Select the “slot” you would like the link to appear in with “program number.” In our example, we're linking to the program “Phase Flange” that is located in the “Chorus/Flangers” 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 “linked” program. If you load a program through a link and later chose to <update> that program, the *actual linked 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 re-



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moved. Instead, the phrase `--NO LINK 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.

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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, Orville 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.

First, make sure that the DSP running the program you wish to compare is shown on the upper left-hand corner of the screen. If it's not, press the DSP A/B key to toggle the display. In our example, we're going to compare the program running on DSP A, "Small Sampler." Notice that the cursor does not need to be highlighting the program you wish to compare.

A: Small Sampler		program
banks	34 Big Loops	14
programs	11 DILATIONLOOP TWO	22
	▶ 12 STEREO BPM LOOP	22
	13 BPM HELIXLOOPVERB	22
◀ Load		▶ save ▶ update ▶ delete ▶

Press the PROGRAM key a few times until you see the <compare> SOFT KEY. Then press it.

A: Small Sampler		program
banks	34 Big Loops	14
programs	11 DILATIONLOOP TWO	22
	▶ 12 STEREO BPM LOOP	22
	13 BPM HELIXLOOPVERB	22
◀ info		▶ bank ▶ link ▶ compare ▶

A: ORIGINAL-PROGRAM		program
banks	34 Big Loops	14
programs	11 DILATIONLOOP TWO	22
	▶ 12 STEREO BPM LOOP	22
	13 BPM HELIXLOOPVERB	22
◀ info		▶ bank ▶ link ▶ compare ▶

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

To return to your tweaked version, simply press <compare> again. You may have noticed that the first time you compare, Orville 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 *Eventide Department of Sociology* suggests a better solution: "*Scientific studies reveal that the primary reason Orville 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

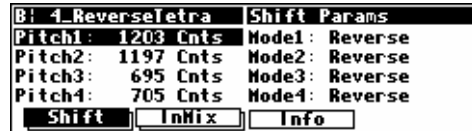
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PARAMETERS

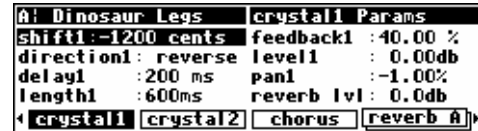
*"I can't tell you what a parameter is, but I'll know it when I see it."
-US Supreme Court*

The **PARAMETER** area is special in that the menus change to reflect the options available in the currently running program (on the currently displayed DSP^{*}). 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.

For the sake of your sanity, it's important to remember that the parameters you are messing with in the **PARAMETER** area belong to the program running on the currently displayed DSP^{*}. For example, on the screen to the right we're messing with parameters for the program "4_ReverseTetra" that is running on DSP B.



Continuing our example, pressing the DSP A/B key toggles the display to DSP A. Now we're messing with parameters for the program "Dinosaur Legs" that is running on DSP A.



Many, but not all, of the programs in Orville 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. 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 Orville will calculate the tempo for you. Change the number of taps used in this calculation with the Average parameter.



^{*} If the upper left-hand corner of the screen reads "A," the "currently displayed DSP" is DSP A. If the upper left-hand corner of the screen reads "B," the "currently displayed DSP" is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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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 Orville's MIDI input defines the system tempo.
- **ext1-8** The value of external modulators 1 through 8 define the system tempo.
→ See "The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 & 2" on page 79 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".

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).



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!



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



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.



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 Orville 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.



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



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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.

→ See "The Concept Behind "Redirection" - External Assigns 1-8 and Trigs 1 &2" on page 79 for information regarding the external modulators. See Foot Pedals 1 and 2 on page 66 for more information regarding the foot 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.



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 12.6 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.

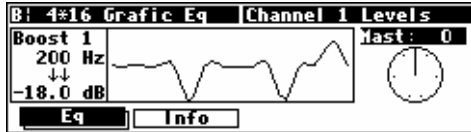
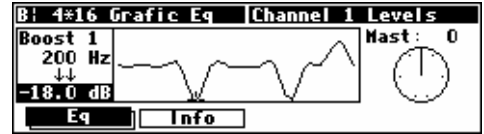


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For example, pressing the LEFT CURSOR key several times on the above screen would change the x value and result in the screen to the right.



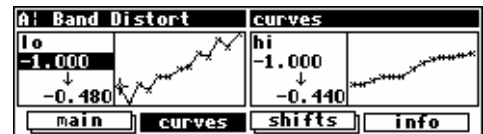
Spinning the KNOB on the above screen would change the y value and result in the screen to the right.



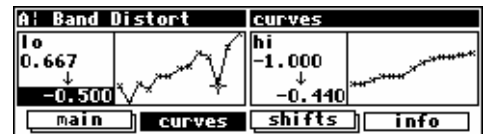
Pressing the DOWN CURSOR key on the screen above would move the cursor from the graphic interface to the Mast parameter.

“Curve” modules behave just like “graphics,” but their function is a little different.

Here we have loaded the program “Band Distort” from the “Inst - Distortion” bank. On the curves menu page in the PARAMETER area, we find two “curves.” Think of the audio signal being processed by this program as ranging in amplitude from -1 to 1. The “curve” sets up an arbitrary relationship between the input amplitude and the output amplitude. The x value is the input amplitude, and the y value is the corresponding output amplitude. In the example above, an input amplitude of -1.0 results in an output amplitude of -0.480. By making the input amplitude slightly different from the output amplitude, you can obtain a subtle distortion.



We could get a little wackier. How about making an input amplitude of 0.667 result in an output amplitude of -0.5? No sweat. By making the input amplitude radically different from the output amplitude, you can obtain a “garbage compactor” distortion.



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STORING AND LOADING SETUPS

As you will have deduced from reading the foregoing text, there are many adjustments you can make to Orville. 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 Orville behave the same as yours? You can!

Access the Routing 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 "routing."



Next, release the PROGRAM key and then hold it down for another second. Now you have reached the Setup Storage Area and the upper right-hand portion of the screen will read "setup."



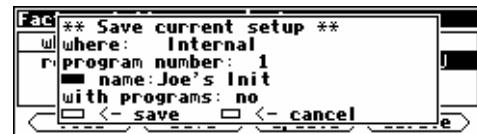
Here we find four SOFT KEYS which in general behave as they do in the PROGRAM area, except that there are only two "banks" (Internal and Card) and the **DSP A/B** has no effect.

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

→ See **Loading Programs** on page 81, **Saving a Program** on page 83, **Updating a Program** on page 84, and **Deleting a Program** on page 84 for more details.

→ To change the "one second hold time," see **Miscellaneous Setup Options** on page 92.

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.
- The current routing is always saved as part of the setup.
- After loading a setup, a small number of non-critical settings, such as screen brightness, will not be restored until the system is restarted.

MISCELLANEOUS SETUP OPTIONS

This menu 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:

Routing Storage on page 16

Setup Storage on page 16

Remote Controlling Parameters on page 83



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Expert mode allows more or less information to be displayed on certain programs, as well as hiding some warning messages, depending on its setting. For more information, see page 33.

Extra sync changes the choice of audio synchronization sources. If it is set to no, the choices are as shown under **Selecting The Internal Clock's Rate** on page 57. If, on the other hand, it is set to yes, two further options appear, as described below. These are normally hidden, since they are rarely used, and a mistake in selection will mute Orville's output.

ext clk this allows Orville to be synchronized to an external TTL level clock. Its use is not recommended for sample rates above 50kHz.

See **Connecting user-supplied crystals and external clocks** on page 98 for more information.

user xtl this allows the use of a user-supplied crystal oscillator, to give sample rates beyond those offered by Orville, such as 32kHz or 44.056kHz.

See **Connecting user-supplied crystals and external clocks** on page 98 for more information.

favorites this parameter 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 have been using....

See **Loading Programs** on page 81 for more information.

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

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APPENDIX A -UTILITIES

TRANSMITTING AND RECEIVING DATA

Setting Up the Serial Port

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

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

The first parameter, `serial`, determines whether the serial port is enabled or disabled. If set to disabled, messages will neither be sent out the serial port nor accepted at the serial port. The second parameter, `baud rate`, determines the speed at which messages will be sent out the serial port *and* the speed at which Orville 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 Orville 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 Orville and the machine connected to the serial port. Higher `baud rate`s 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 Orville 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 Orville is communicating with is constrained to some other values. If that is the case, change the values on Orville to match the other device.

To aid in troubleshooting, the BUSY LED will illuminate when data is transferred at the serial port, provided 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.

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Dumping Data and Receiving Data Dumps

You can “dump” data from Orville for external storage or for use in another Orville. 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 Orville 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 on the DSP referred to by the upper left-hand corner of the screen (*press the DSP A/B key to toggle the display*). If received at the MIDI In port or at the serial port, Orville will load the received program into the currently displayed DSP* (*press the DSP A/B key to toggle the display*).
- `dump setup` This function dumps the state of the Orville, covering all of the parameters covered in the `SETUP` area except for routings.
- `dump files` This function dumps all *setups*, *programs* and *routings* 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, Orville 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 programs 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, Orville 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` for each DSP. It dumps all the setups and programs stored in internal memory, along with the current setup and the programs running on DSP A and DSP B. If received at the MIDI In port or at the serial port, Orville will replace all of its setups and programs, load the two new programs on their respective DSPs, 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 Orville.

WARNING: If, for any reason, this dump gets corrupted in some way and you send it back to Orville, you will lose all the information you are trying to back up, as well as Orville'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 Orville has been recorded accurately.

* If the upper left-hand corner of the screen reads “A,” the “currently displayed DSP” is DSP A. If the upper left-hand corner of the screen reads “B,” the “currently displayed DSP” is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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Controlling One Orville from Another Orville

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

To slave one Orville to another:

- set the parameter `sequence out` found on the `midi/ext` menu page in the SETUP area to `off` on the “slave.”
- On the same menu page, set the parameter `sequence` 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.)

```
01 Dual External Sh global configure
MIDI: enabled      system exclusive: on
serial: enabled    device ID: 1
program load: off  *remote*: on
sequence out: off
← service midi/ext mod con display →
```

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 Orvilles in a very bad sort of way.

Sending A Program From One Orville to Another

To send a program from one Orville to another, turn `sequence out` to `off` on the `midi/ext` menu page in the SETUP area on both Orvilles. On the same menu page, change the `device ID` of each Orville so that they agree. Then connect their serial ports or connect the MIDI Out port of the “sender” to the MIDI In port of the “receiver.” Make sure the program you would like to send is running on the currently displayed DSP* on the “sender” (*press the DSP A/B key to toggle the display*). Make sure that the DSP you would like to run the program on in the “receiver” is the currently displayed DSP* (*press the DSP A/B key to toggle the display*).
→ To read about using the serial ports, see **Setting Up the Serial Port** on page 94.

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 Orvilles so that it 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 Orvilles!

* If the upper left-hand corner of the screen reads “A,” the “currently displayed DSP” is DSP A. If the upper left-hand corner of the screen reads “B,” the “currently displayed DSP” is DSP B. Both DSPs are always running, but only the parameters for one of them can be displayed at a time.

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Sequencing With MIDI

Most MIDI sequencers will receive system exclusive messages and store them for later playback on the originating instrument. Orville fully supports this. Instead of sending keyboard presses and knob turns, Orville sends “parameter change messages.” When a sequencer sends a “parameter change message” back to Orville, 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 Orville as you normally would *while* it’s receiving “parameter change messages” from a sequencer.

Newer versions of Orville 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.



Simply play back the recorded MIDI sequence at Orville’s MIDI In, and you will see the changes you recorded “played” by the sequencer (*assuming MIDI is enabled, system exclusive is on, the programs that were loaded when the sequence was recorded are loaded during playback on their respective DSPs, 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 Orville loop back into Orville without delay, digital demons will unleash a raging fury inside your helpless Orville. 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 Orville! However, doing this would render the “echo” feature discussed below useless.*

All adjustments made to Orville 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 Orville and receiving data from Orville *at the same time*, it will receive an “echo” of the commands it sends to Orville. This means that if you change something on Orville 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.

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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 Orville'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.

See **Miscellaneous Setup Options** on page 92 to enable the use of External Clocks.

Since this socket connects directly to Orville's internals, incorrect usage may damage Orville'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 Orville, such as 32kHz or 44.056kHz. This oscillator should be installed in the socket at location Y401 on Orville'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.)

See **Miscellaneous Setup Options** on page 92 to enable the use of User-supplied Crystal Oscillators.

Since this socket connects directly to Orville's internals, incorrect usage may damage Orville'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

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SERVICE AND START-UP OPTIONS

Fixing Internal Memory Problems

Orville uses solid-state memory circuits to store programs, the routing configuration, and setup. These circuits use a long-life battery to keep them alive while Orville is turned off. Whenever the computer in Orville 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 Orville is turned on, it runs a checksum calculation on the memory and compares the result against the stored result. If there is a discrepancy, Orville 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, routing configurations and setups to a card (see *Copying Programs* on page 84) or to an external storage device (see *Dumping Data and Receiving Data Dumps* on page 95). 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 Orville, 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.

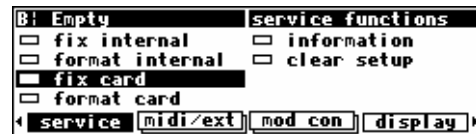
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Fixing Memory Card Problems

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 Orville, use in some other computer, or a myriad of 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.



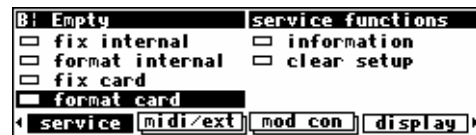
Go to the service menu page in the SETUP area.



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 95) OR copy all valuable internal programs and routing configurations to a different Memory Card, copy the faulty Memory Card’s programs and routing configurations to internal memory and then to another Memory Card (see *Copying Programs* on page 84). 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. . .

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Changing the internal battery

A small button-type battery is mounted internally and powers Orville's memory when the power is off. This should last about five years before it needs to be changed, longer if Orville 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 Orville 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 Orville 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. The parameters affected include:

- everything in the BYPASS area.
- everything in the LEVELS area.
- everything 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 92).* Press the `<no>` SOFT KEY to abort. If Orville 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

Orville has expansion and upgrade capabilities. "Information" menu pages allow you to keep track of what options are inside an Orville 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.



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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.



One important piece of information to be found in this area is your Orville'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 unimportant. The Hours total/power refer to the total number of hours that have elapsed since the unit was built (1248 in this case) and the total number of hours the unit has been powered (206 in this case). A brand new unit may show as many as 300 powered-up hours to cover burn-in and factory testing.



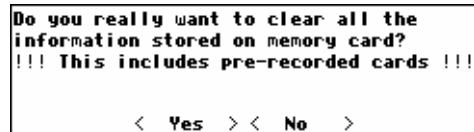
Start-Up Options

There are several "secret keys" that can be depressed during startup to perform special functions. These keys should be pressed and held down during the second "start-up screen" - the one with the "Orville" 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.

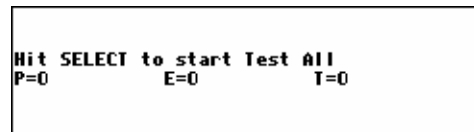


CXL

Bypass start self tests. Orville 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 Orville to powerup more quickly.

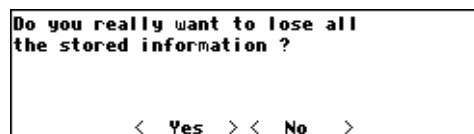
5

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.



8

Clear internal programs and setup. This key does the same thing as format internal on the service menu page in the SETUP area. The purpose of this special

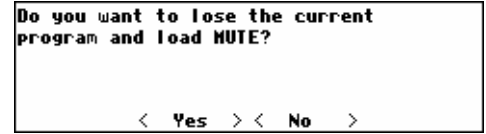


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key is to initialize the unit at the factory, and to fix a memory problem that might prevent the unit from working correctly. Press the <Yes> SOFT KEY to go ahead or <No> to abort. The need for this operation should be quite rare. If problems arise that require its use more than once, the factory should be contacted.

PROGRAM

Loads "Mute" into both DSPs instead of their current programs. Press the <Yes> SOFT KEY to go ahead or <No> to abort. This function is used in the event that one of the last-run programs caused the unit to lock up.



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 Orville starts acting 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.

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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

4 AES or 2 AES and 2 S/P DIF at 44.1-96kHz, all with sample rate conversion/synchronization. AES relay bypass at power down.

Analog Input (XLR Balanced Inputs)

Impedance	>20kOhm, bridging
Full Scale Input Level	26dBu
Dynamic Range	>110dB
Signal to Noise Ratio	>110dB, A-weighted
THD+N	<0.002% @ 1Khz, -3dBFS
Crosstalk	<-100db @ 20 Hz to 20kHz, -1dBFS

Analog Output

Impedance	<50Ohm
Full Scale Output Level	26dBu
Dynamic Range	>110dB
Signal to Noise Ratio	>110dB, A-weighted
THD+N	<0.002% @ 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 and external power jack.

Memory Card Interface

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

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Factory Preset Capabilities (at 48k sampling)

Pitch shifting:	up to 8 channels
Compressor/limiter:	up to 8 channels
Equalization:	up to 128 bands parametric single input, 16 bands at 8 channels
Sampling with time compression:	up to 174 seconds mono
Digital delay:	up to 87 seconds mono in addition to 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.

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WARRANTY INFORMATION

Limited Warranty

and other legal stuff, terms and conditions

The Eventide Orville™ 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 this manual, your recourse is this warranty.

What the warranty does and does not cover

Orville has a one-year warranty against defects in material and workmanship. During this period we will repair or replace (at our option) the unit.

This means that if the unit fails under normal operation, because of defective parts, or because of defects in construction that become apparent (such as bad solder joints, printed circuit board traces, etc.), we will repair the unit at no charge for parts and labor. We also assume a limited responsibility for shipping charges, as detailed below.

The warranty *does not cover* damage or defects due to accident or abuse. Orville 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 becomes defective for these or similar causes, and the unit is deemed to be economically repairable, we will repair it and charge our normal rates.

It *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.

Who is covered under the warranty

The warranty applies to the *original purchaser* from an *Authorized Eventide Dealer*, providing that the dealer sold a *new* unit. *Demo* units are also covered under 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 that 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.

When the warranty becomes effective

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 form*.

When we receive a unit, this is how we determine whether it is under warranty:

1. **If** the unit was shipped within the past *calendar year*, we assume that it is, 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*) *longer than a calendar year ago*, we assume it *isn't under warranty unless*:
 - A. There is a warranty 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 so, *and we charge you for the repair*, 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 so*, 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 form when you purchase the unit. Also, if we know who you are, we can send you updates, notifications, and advise you of new products. It will also enable you to receive pre-shipment of parts discussed herein.

Who performs warranty work

The *only* company authorized to perform work under this warranty is **Eventide**, Little Ferry, NJ. 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 *labor* or *parts* from you or from third parties.

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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.
 - B. Alleviating user error or interconnection problems that may be preventing Orville from operating to its full capability.
2. We are available for telephone consultation if the dealer is unable to assist.
3. If a part fails during the warranty period and you wish to replace it yourself, we will normally ship the part immediately at no charge, providing your warranty form is on file. (We reserve the right to request that the defective part be returned to us.)

Responsibility for warranty repair shipping

For us to work on your unit, it must be here. Shipping suggestions are given below. This section details who pays for it all.

Shipping within the 50 United States

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

We will return it 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 so 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 United States

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

If you wish to return it 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 US 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 goods* 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 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 effected by checks drawn on any bank in the US, or by telegraphic fund 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.

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