

ROCKMAN™
STEREO CHORUS / DELAY

OPERATING MANUAL





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Front Panel Controls

Headroom LED's
Monitor internal signal levels. With proper setting of drive level switch, yellow LED should light often, red LED should light very rarely.

Sweep Speed
LED indicates speed selected. Slider controls character and intensity of chorus effect.

Mode Select Switch and LED's
Switch determines whether unit is operating in CHORUS or DELAY mode. LED's indicate mode.
Note: Using a footswitch overrides the mode switch.

Feedback
Adjusts the number of repeats.
CAUTION: At ∞ position, will cause loud echo "runaway"!

Delay Volume
Adjusts volume of all echoes from full level to -12dB.

Bypass LED
Indicates bypass mode. Can be activated only by footswitch.

Drive Level
Provides optimum operating level for internal circuitry, to minimize both distortion and background noise. Does not change output levels.

Chorus PreDelay
Selects NORMAL PREDELAY for standard CHORUSING or LONG PREDELAY for pronounced doubling effects.

Delay Time Slider and Switch
Provides settings from 20 to 200 ms in two ranges. Switch determines which range is active on the slider.

Output Mix
Determines stereo mix of chosen effect. LED's indicate which switch is active. Mix A is normally active with CHORUS, Mix B with DELAY, unless a separate footswitch is used. With mono output, provides four intensities of effects.

Power
CAUTION: Turn CHORUS/DELAY on before the power amp. If no LED's are lit, the unit is off.

LEVEL
HEADROOM
GTR +10
LINE 0
DRIVE LEVEL -10

CHORUS
SWEEP SPEED ON
NORM 1/2 1/3 1/4
Hz

MODE SELECT

DELAY
FEEDBACK ON
2 4 8 ∞
IN LONG
OUT SHORT
DELAY TIME (ms)
20 40 60 80 100 120 140 160 180 200

DELAY VOL
0 -12

OUTPUT MIX
A B
WIDE NORM EQUAL SUBT
STEREO MONO

BYPASS
POWER
1981 SRD

ROCKMAN STEREO CHORUS/DELAY

General Operating Instructions

These General Operating Instructions will get you started using your ROCKMAN™ STEREO CHORUS/DELAY right away. We urge you to read the rest of this manual soon, so you will fully understand and be able to better enjoy all the capabilities of this sophisticated signal processor.

1. Check that the CHORUS/DELAY power switch is OFF (out), and then connect the power cord to an AC outlet. CAUTION: line voltage must match the voltage requirement printed on rear panel of the unit.
2. Using two cables, connect the rear mounted CHORUS/DELAY output jacks to two channels of a stereo power amp, stereo mixer, or two guitar amps. For mono applications use only the output marked "mono" and a single cable to your sound system.
3. Move all sliders and slide switches to the normal positions, as marked by the small triangles. Set the FEEDBACK slider to the extreme left, and the DELAY slider to the extreme right. Set all push buttons to their OUT position. For mono applications, set both OUTPUT MIX switches to MONO EQUAL position.
4. Plug your guitar, keyboard, or other instrument into the rear INPUT jack. If you are using the ROCKMAN SUSTAINOR™, plug SUSTAINOR output into the CHORUS/DELAY input.
5. Set the volume control on your amplifier or mixer the same as if you were not using the CHORUS/DELAY. The CHORUS/DELAY is a unity gain device, adding no amplification to its input signal.
6. Push the CHORUS/DELAY power button ON before turning on your amplifier to avoid power-up transients from reaching your speakers.

You are now ready to use the NORMAL STEREO CHORUS mode of the CHORUS/DELAY. Adjust the LEVEL switch so the YELLOW LED lights often and the RED LED lights seldom.

For echo effects, push the MODE SELECT button. The LED's will indicate that you are now in the DELAY mode.



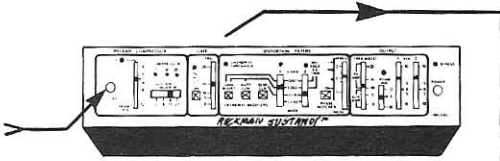
FRONT PANEL



REAR PANEL



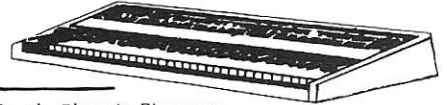
In/Out



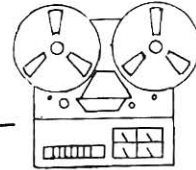
SUSTAINOR™ with Instrument Source



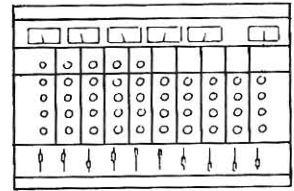
Active or Passive Pickups



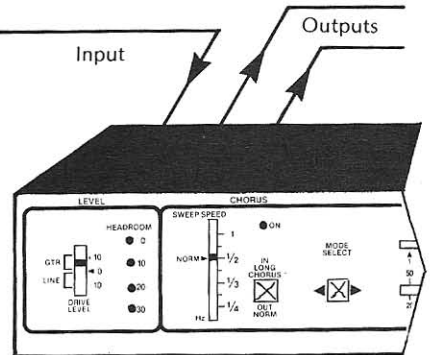
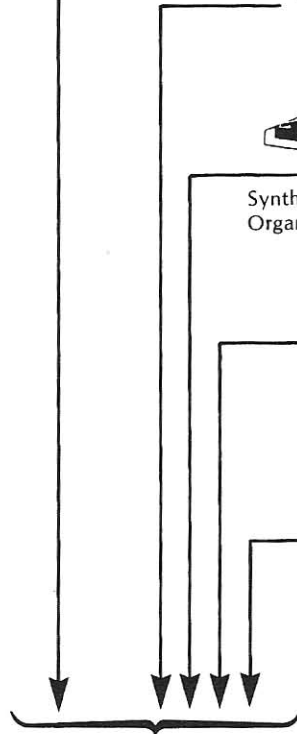
Synth, Electric Piano or Organ



Record tracks "dry" in mono, use the CHORUS/DELAY to create STEREO during mix down.

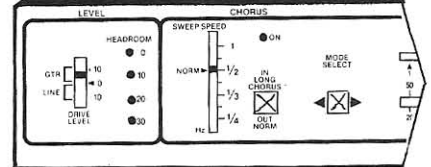


Use mixer's effects send for easy selection of various instruments and recorded tracks.



INPUT

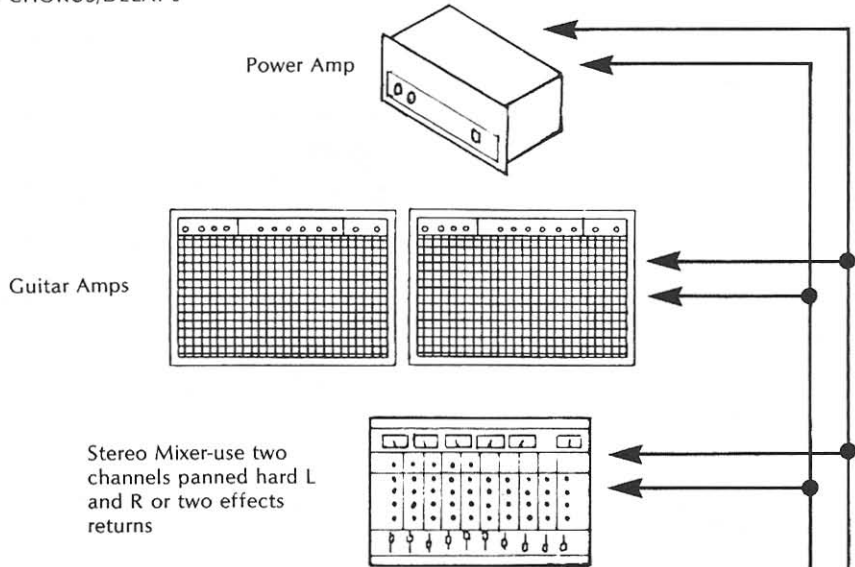
Impedance over 2MΩ
Max Level 3Vms
(+9 dBv)



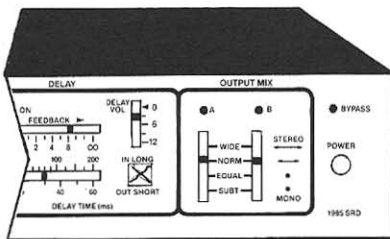
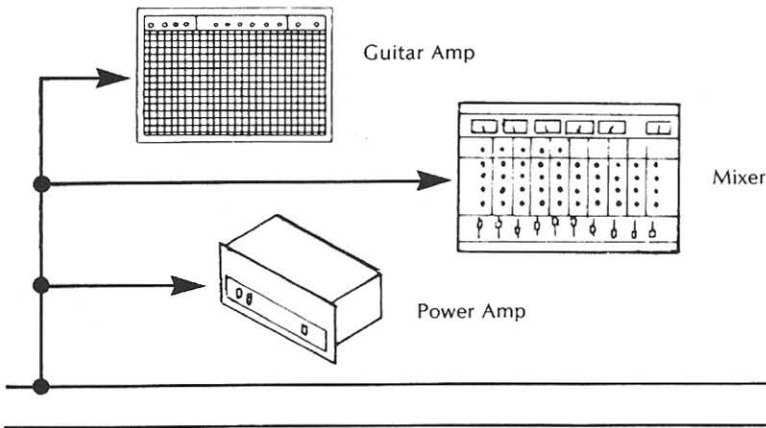
ROCKMAN™ STEREO

Connections

Stereo Operation makes fullest use of the ROCKMAN™ STEREO CHORUS/DELAY's capabilities!



Mono Operation

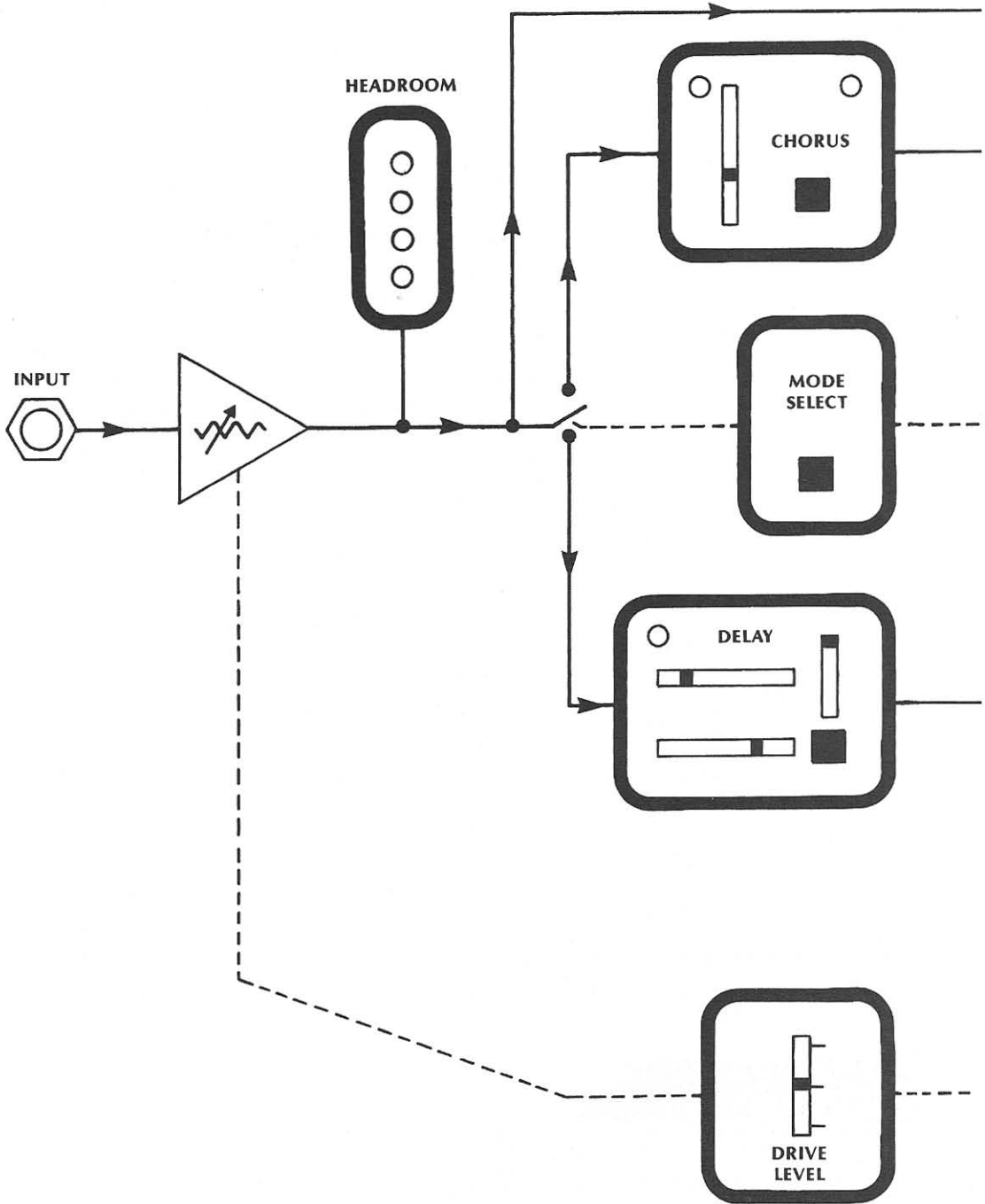


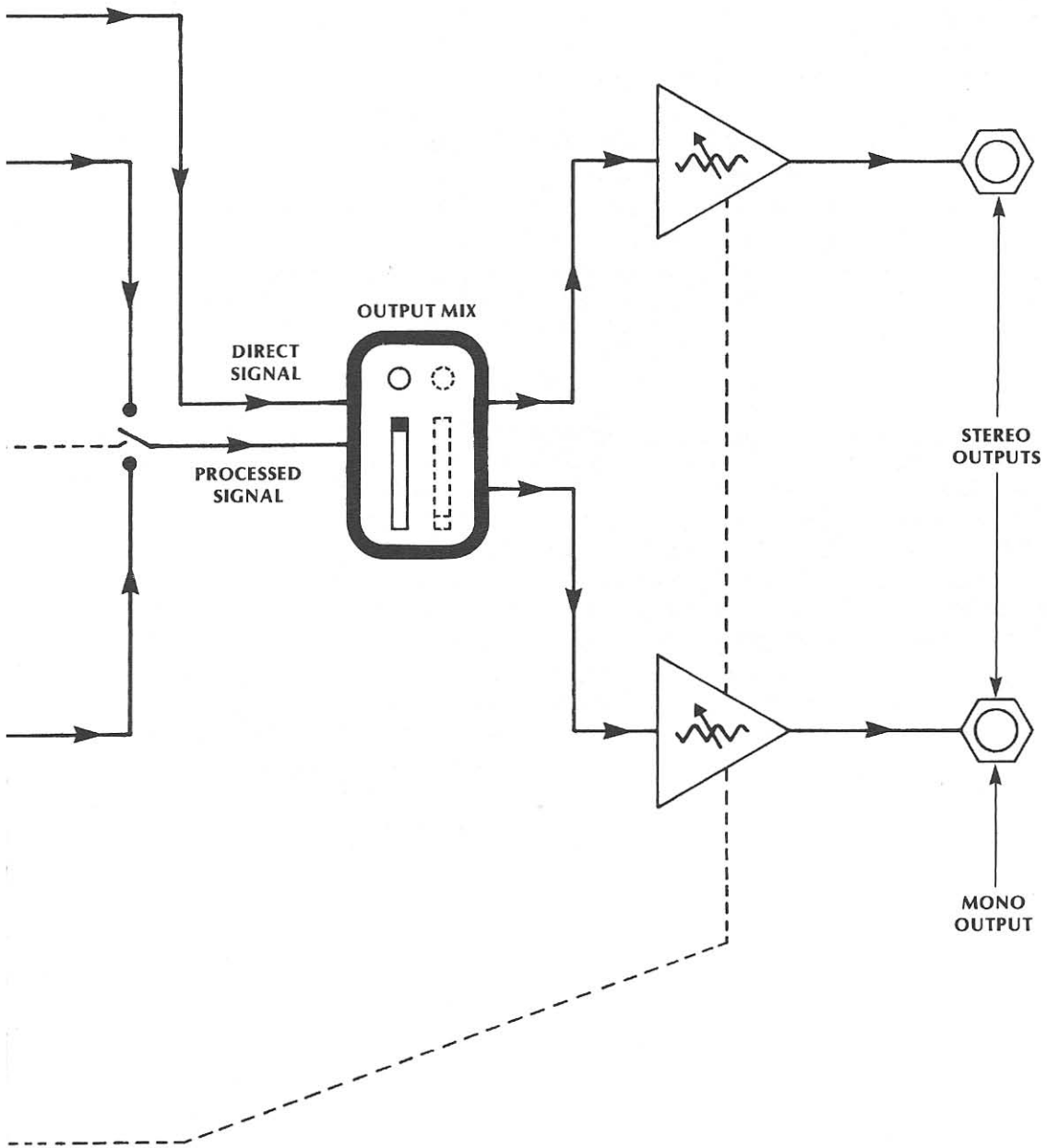
OUTPUTS

Impedance 1 K Ω
 Max Level 3Vms (+9 dBv)
 Will drive any load over 1K Ω .



Signal Path







Applications

Using Chorus

- Use NORMAL PREDELAY and NORMAL SWEEP SPEED ($\frac{1}{2}$ Hz) to obtain the classic ROCKMAN CHORUS effect that works great with clean guitar and piano parts. For distortion guitar sounds, try increasing the SWEEP SPEED for a stronger effect. Using LONG PREDELAY gives an expanded spatial presence.
- For keyboards, try a slower SWEEP SPEED to simulate the detuning effect of rotating speakers. For piano sounds, this setting can also simulate the beating sound caused by the multiple strings of an acoustic piano.
- Use LONG chorus for vocals to create a double tracking effect. The pitch detuning helps smooth out slightly out-of-tune notes.
- The MONO EQUAL mix position gives the strongest phasing and vibrato sounds by electrically combining the direct and processed signals. The varying time delay causes certain frequencies to cancel out (phasing), while the pitch differences cause rhythmic beating (vibrato).

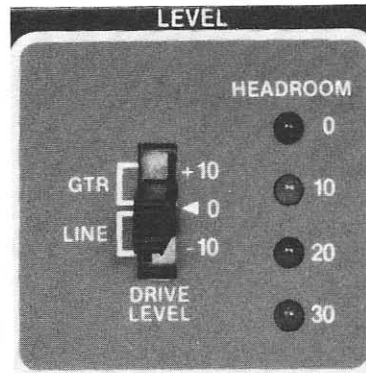
Using Delay

- Use short delays of 20 to 60 milliseconds at full delay volume with no feedback to simulate spatial images. For percussive sounds, the shortest delays work best, while longer delays are good for many guitar and keyboard sounds and vocals. Use WIDE or NORMAL stereo mix. Although each output channel will have equal volumes, the sound will appear to originate from near the side with the most direct signal.
 - Use medium delays of 50 to 100 milliseconds with no feedback to simulate a single “slapback” echo. This effect works great with vocals and with heavy distortion guitar. Whammy bar effects and synth note bends take on new dimension with a slapback.
 - Add feedback to longer delays of 100 to 200 ms to obtain standard echo effects that are great for guitar leads. A little echo will add density to thin mixes, and can increase the perceived volume of an instrument. A mono mix can be useful for repeat echos.
 - If you use a spring reverb, you can make it sound 100% better by adding a predelay to your effects send. A predelay of about 30 to 100 ms will simulate the response of a typical hall, where no reverb appears until the sound starts to bounce around the room. Use a WIDE mix, and add the reverb only to the processed (time delayed) output.
-

Detailed Function Description

Level Controls

Use the DRIVE LEVEL switch to match the CHORUS/DELAY internal gain to the audio signal you are providing. The best match will minimize both distortion and background noise. In any switch position, the output level is the same as the input level.



The HEADROOM LED's indicate the signal level in the circuitry. The RED LED indicates the level is approaching distortion, and should light infrequently. If the RED LED is on often, lower the LEVEL switch one notch. The YELLOW LED indicates the best signal level for minimum noise. If the YELLOW LED does not light at all, raise the LEVEL switch one notch.

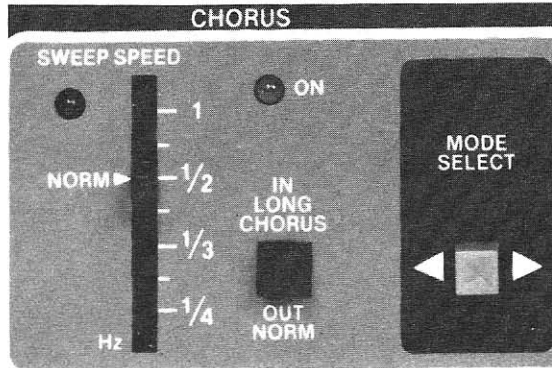
For a typical line level signal, the 0 switch position is probably best. For a straight guitar input, you may need the +10 position. When using a ROCKMAN SUSTAINOR, set the DRIVE LEVEL to -10. Be sure to monitor the LED's and adjust the switch for the optimum operating point.

NOTE: If the RED LED is lit often, even in the -10 position, you must lower the signal level at its source.



Chorus Controls

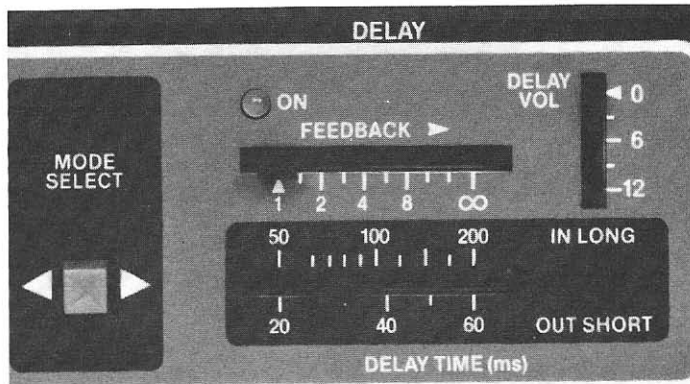
The PREDELAY switch selects a nominal delay of 20 milliseconds (NORMAL), or 50 milliseconds (LONG). The sweep oscillator causes the delay to vary between 20 and 24 ms, or 50 and 54 ms in the two positions. The NORMAL predelay is just long enough to give a lifelike stereo image, while the LONG predelay creates a more intense effect that simulates two distinct sound sources. Full frequency response up to 14KHz is provided in both predelay settings.



The SWEEP SPEED slider controls a low frequency oscillator which modulates the time delay. The range of the sweep oscillator is 1Hz to .25Hz, (one cycle per second to one cycle every four seconds), as indicated by the flashing SWEEP SPEED LED. Slow speeds provide a subtle phasing effect, while faster speeds create a more rhythmic vibrato-like effect, with more pronounced pitch detuning. The nature of the chorusing effect is also dependent upon the setting of the OUTPUT MIX switch. (See OUTPUT MIX section).

Delay Controls

The DELAY TIME slider and switch allow a delay adjustment from 20 to 200 milliseconds in two ranges. The SHORT range (switch out) is 20 to 60 ms, and gives full frequency response up to 14KHz. The LONG range (switch in) is 50 to 200 ms, with a frequency response that smoothly varies from about 15KHz down to 4KHz at the longest delay settings. The variable filtering assures the maximum frequency response for any given delay time.



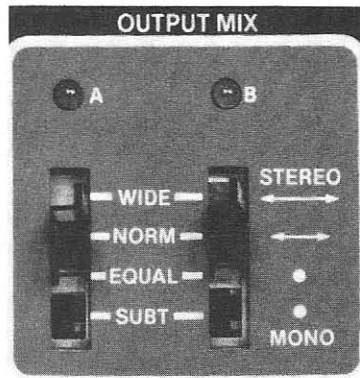
The FEEDBACK slider determines the number of echo repeats. At the far left position, a single echo is heard, with no regeneration. As the slider is moved to the right, multiple repeats will appear. A gentle treble roll-off filter of -6dB per octave above 3.5KHz in the feedback circuit provides a natural sounding echo similar to a concert hall or tape echo.

Setting the FEEDBACK slider at ∞ (maximum) will cause notes to feedback indefinitely. CAUTION: the infinite repeat setting can cause loud sounds that might damage your ears or speakers! By backing off slightly from ∞ feedback, you can set the DELAY for many repeats without fear of "echo runaway".

The DELAY VOLUME slider allows setting the echo volume relative to the direct signal. A range of 0 to -12dB is useful for both solo and ensemble playing.



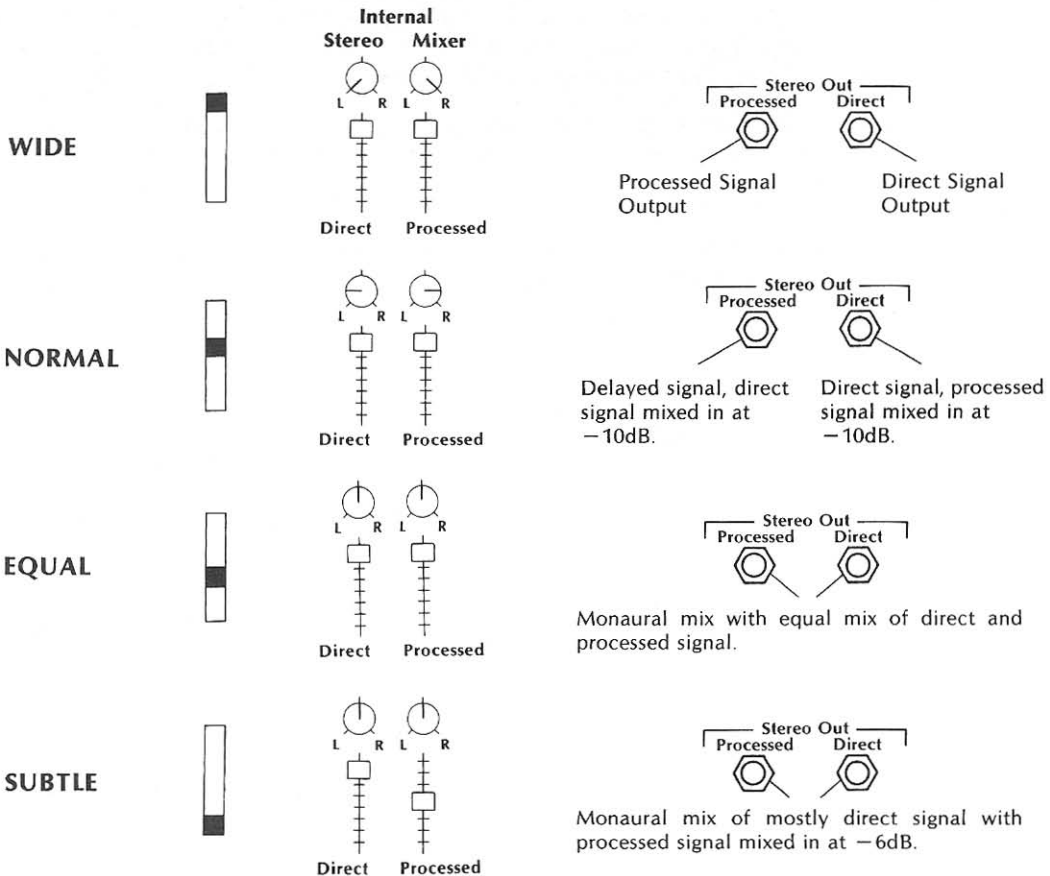
Output Mix



The OUTPUT MIX section allows you to preset two separate mixes of direct and delayed signals. Only one mix switch can be active at a time, as indicated by its LED. If no footswitch is connected to the rear panel mix jack, MIX A is active in CHORUS mode, and MIX B is active in DELAY mode. Using a separate footswitch allows independent mix switch selection.









Stereo Operation

The OUTPUT MIX section can best be understood by picturing the internal stereo mixer with direct signal at one input, and processed signal at another input.



Mono Operation

When the mono output is used, the OUTPUT MIX switch functions are different, providing four mono mixes:

WIDE		 Mono Out	No effect. Direct signal only.
NORMAL		 Mono Out	Slight effect. Direct signal with processed signal mixed in at -10dB .
EQUAL		 Mono Out	Maximum effect. Direct and processed signal mixed at equal levels.
SUBTLE		 Mono Out	Medium effect. Mostly direct signal with processed signal mixed in at -6dB .

To Get Processed Only Output

Set the OUTPUT MIX to STEREO WIDE and use the output marked "PROCESSED" to obtain a time delayed signal with no direct component. Use of this signal requires external mixing equipment for useful effects.

The OUTPUT MIX circuit has been designed to provide the same apparent volume for all switch positions. In the STEREO WIDE position, the output amplitude matches the input's (unity gain). The MONO settings, however, can create peaks in the output signal that are larger than the input.

If clipping occurs when using the MONO positions, as indicated by the RED 0 db HEADROOM LED, set the DRIVE LEVEL SWITCH to a lower position, and if necessary, reduce the level of your input signal.

Footswitching



The MODE SELECT footswitch disables the MODE SELECT front panel switch, and allows remote selection of CHORUS or DELAY mode. Only one mode can be active at a time.

The MIX SELECT footswitch allows remote independent selection of MIX A or MIX B, as preset on the CHORUS/DELAY. If no plug is inserted in the MIX SELECT footswitch jack, the MIX SELECT will follow the MODE SELECT (MIX A for CHORUS, MIX B for DELAY).

The BYPASS footswitch allows cancelling any effects set up on the CHORUS/DELAY. The audio signal still passes through a low noise buffer circuit, so power to the CHORUS/DELAY must be on for signal to flow.

When you footswitch from CHORUS or DELAY mode to BYPASS mode, the apparent volume of the mix remains unchanged. The 3dB increase in apparent volume that normally occurs when a chorused or delayed signal is replaced with a direct signal in a mix is automatically compensated for.

The rear mounted $\frac{1}{4}$ " mono footswitch jacks are designed to work with any push on/push off footswitch (short to ground), or the ROCKMAN™ FOOTSWITCH.

Any footswitch jack can be "Y"ed to a footswitch jack of another ROCKMODULE™. For example, one footswitch can cause a ROCKMAN SUSTAINOR to switch channels and simultaneously cause the CHORUS/DELAY to switch modes.

Theory

Chorusing

The purpose of chorusing is to make one instrument, with clearly defined pitch and timing, sound like two or more instruments. Just as a string section, with its minute variations in pitch and timing, sounds richer and more interesting than a single fiddle, a chorused guitar or keyboard can sound more lifelike than an unprocessed instrument.

The ROCKMAN CHORUS works by splitting an instrument's sound into two different signals. One signal is the same as the input, while the other signal is slightly delayed in time and changed in pitch (detuned). The SWEEP oscillator affects the amount of delay and determines the depth of chorusing. When the delay time is shrinking, the pitch of the signal goes up, and when the delay is increasing, the pitch goes down. The faster the SWEEP oscillator fluctuates, the faster the time delay grows and shrinks, and the greater the amount of detuning.

RAILROADS

You can understand this process by imagining a train speeding towards you. The train's whistle sounds sharp as it approaches, because the time delay from the whistle to your ears is shrinking. As the train passes you, the whistle sounds flat, because the time delay is increasing. If the train goes very slowly past you, the pitch shift will be minimized, but a fast train's whistle will really dive in pitch. If you could make the train turn around, the pitch would rise again. We have replaced the train with an electronic circuit called a bucket brigade device.

Delay

There's a lot to say about time delay and chorusing. Here are just a few ideas to give you some things to think about!

PSYCHOACOUSTICS

The most important fact to know about using time delay is that it takes time for sound to travel through the air. The speed of sound is about 1000 feet per second, or one foot per millisecond. Your ear is used to hearing sounds, and knows that sounds from far away take longer to be heard than sounds nearby. By using electronic time delays, you can fool your ear into thinking that sounds are coming from places they are not.

THE COCKTAIL PARTY EFFECT

Just as it takes two eyes for good depth perception, it takes two ears to properly locate sounds. Your brain analyzes what your two ears hear, notes differences in the arrival time of sounds on each side of your head, and tells you where the sound is coming from.

For example, if someone drops a glass 6 feet to your left, the sound will reach your left ear in about 6 milliseconds. To reach your right ear, however, the sound might have to bounce off a distant wall, and not arrive for another 20 milliseconds. This delay will tell you where the sound originated, and also how big the room is!

If you are at a noisy cocktail party and bombarded by a confusion of sound, you can still pick out each conversation in the room because your brain separates all the sounds by where they seem to originate. If your band or tape is a confusion of sound, careful use of time delay can add clarity to all parts of the music, or make one instrument jump out of the mix.



Specifications

INPUT	Impedance..... Over 2M Ω Maximum Level..... 3Vrms (+9 dBv)
CHORUS	Frequency Response..... +1, -3 dB to 14 KHz Sweep Speed Range..... .25 Hz to 1 Hz
SHORT DELAY	Frequency Response..... +1, -3 dB to 14 KHz Delay Range..... 20 to 60 milliseconds
LONG DELAY	Frequency Response..... Variable, 15 KHz to 4 KHz Delay Range..... 50 to 200 milliseconds
STEREO OUTPUTS	Impedance..... 1K Ω Maximum Level..... 3Vrms (+9 dBv)
SIGNAL TO NOISE	S/N..... Over 90 dB
DIMENSIONS	8½"W, 5½"D, 1¾"H..... (Standard half-rack width)
POWER REQUIREMENT	3W, line voltage as marked on rear panel
ACCESSORIES Purchased Separately	19" Rockmodule Rackmount (holds two units) Rockman Footswitch

Specifications subject to change without prior notification.