

PDS 20/20

DIGITAL STEREO CHORUS / FLANGER / DELAY



 Digitech

INTRODUCTION

The PDS 20/20 is a digital flanger/chorus with up to two seconds of echo delay at full bandwidth featuring stereo outputs, a 13 to 1 sweep ratio, and infinite repeat. DigiTech's unique dual foot switch system offers unparalleled versatility at a touch. The delay or the infinite repeat can be alternately selected by pressing the left foot switch. The right foot switch alternately switches the effect in and out. There are six controls: a three position time range switch, a speed control which adjusts the rate of the sweep, a width control which adjusts the variation in delay time up to a ratio of 13 to 1, a delay time control which adjusts the length of delay within the selected range, a

regeneration control which adjusts the amount of delayed signal fed back to the delay for echo effects, and a mix control which adjusts the amount of input signal mixed with the effect signal. A single 9 volt battery, which is accessible from the top of the unit, powers the PDS 20/20. The PS-3 battery eliminator can be used to power the unit from 110 volt outlets.

Whether you want to have a flange sound for heavy metal guitar or to add a gentle chorus to a flute, or to build-up a layered lick to play against, the PDS 20/20 has the features, the bandwidth, and the performance to do the job.

HOW THE PDS 20/20 WORKS

In order to get the most out of your PDS 20/20 it is important to understand how flange, chorus and delay effects are generated.

The PDS 20/20 is a digital delay. A digital delay works by taking a small sample of the sound and converting its level to a digital number (ones

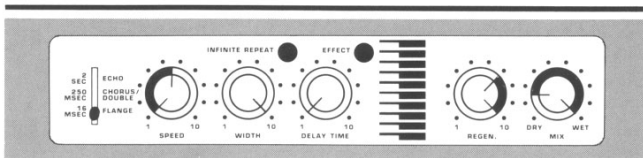
and zeroes) and storing the number in a memory. The PDS 20/20 does this very fast, up to 400,000 times a second. The range selection switch selects how much memory space is available. And by changing the delay time control, the amount of delay time

is varied within the delay range selected.

When a sound is delayed a few milliseconds and mixed with itself, some frequencies are cancelled, and some frequencies are reinforced. This is an effect known as comb filtering, because a graphic illustration of the effect looks like the tines of a comb across the frequency spectrum. Changing the amount of time the signal is delayed changes the position of the tines of the comb. And if the delay time is constantly changed, the

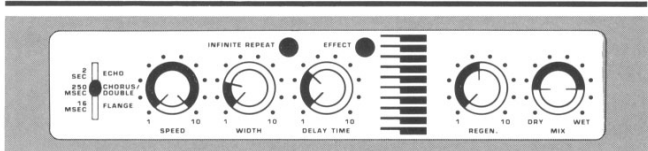
comb sweeps through the sound like a jet doppler effect. This effect is known as **FLANGING**. (From the time in a recording studio when two reels of the same song were played back on two tape machines and the engineer dragged his finger on the *flange* of one of the reels to change the play back speed and delay the sound of one of the tape machines.)

The flanging effect is generated by constantly changing the amount of delay time.



Flanging uses very short delay times (1 to 12 ms.) and usually a lot of width at a slow speed. Width refers to the ratio of longest to shortest delay time; the more width the higher the ratio. Speed refers to how fast the delay time changes. A fast speed is used for vibrato and shimmer type sounds, while a slow speed is used

for smooth sweeping type sounds. The flanger's characteristic sound comes from mixing the dry and the delayed signal together. Regeneration makes the comb filter effect more pronounced, adding a resonant flavor to the sound.

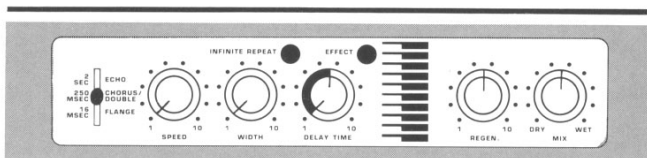


Chorus uses longer delay times than flanging, (4 to 50 ms.) less width, and no regeneration. When using delay times in this range varying the delay time will cause the pitch of the delayed signal to be changed. Mixing the delayed signal with the dry signal also causes notches and peaks in the frequency response. However, in this range of delay times the notches and peaks are close enough together that any coloration is very subtle. This amount of delayed signal time can be heard as a separate signal, and when mixed with the original signal, the varying amount of delay, the subtle changing comb filtering, combined with the mild pitch shift, is what gives chorus its characteristic sound. One of the characteristics of the constantly changing time is a pitch shifting of the delayed signal. If the delay time is being lengthened, the pitch is lowered, and if the delay time is being shortened, the pitch is raised. So one of the cautions in using the chorus

setting is to be certain to balance the amount of delay time variance (WIDTH) with the rate of delay time change (SPEED), in order to avoid an "out-of-tune" sound in the effect, as when using a wide WIDTH and a fast SPEED settings. Use a wide WIDTH setting with a slow SPEED setting or, use a relatively short WIDTH setting with a fast SPEED setting, balancing each according to taste. Personal preference plays a big part in setting up a chorus, as there are many different settings that sound good. To set up a chorus: first set the TIME RANGE SWITCH to 16 msec and the DELAY TIME to a medium setting, or to 250 msec and a short setting; and the WIDTH control to a medium setting. Set the SPEED control to the desired sweep rate and then readjust both the DELAY TIME and the WIDTH controls to achieve the desired chorus sound. Balance the SPEED setting against the WIDTH setting to avoid an "out of tune"

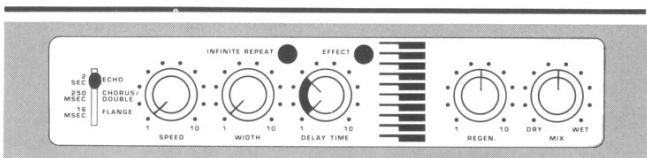
sound. Wider WIDTH settings (time delay variation) require slower SPEED settings (sweep rates), and faster SPEED settings require narrower WIDTH settings. Longer TIME DELAY

settings create a thicker sound and shorter TIME DELAY settings create a more colored sound in a chorus effect.



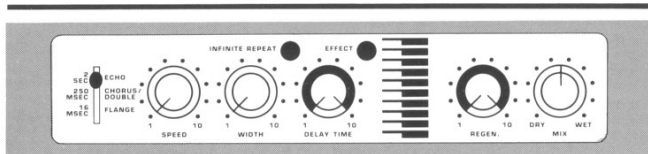
Doubling uses slightly longer delay times than chorusing, (40 to 60 ms.) and no width or speed. Rather than sounding like two different players playing the same line as in chorusing, doubling does what it sounds like . . . it sounds like the same line played just slightly behind the original. The

signal is delayed enough to be heard as two signals, but with little comb filtering effect. For doubling, set the TIME RANGE SWITCH to the 250 msec position, the DELAY TIME control to medium low, and the MIX and REGENERation controls as desired.



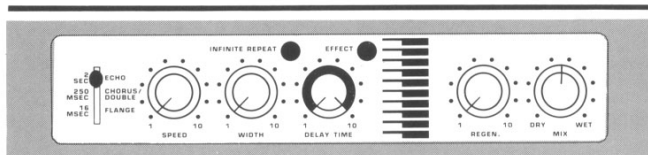
Slap back uses a longer delay time than doubling (55 to 100 ms.). Set the TIME RANGE SWITCH to the 250 msec position, DELAY TIME low,

REGENERation low and MIX control as desired.



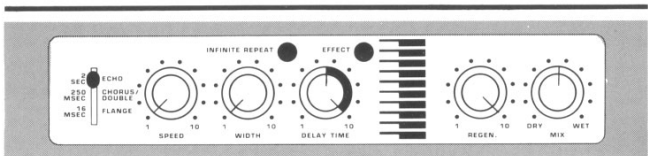
Echo can use almost any of the delay time settings of the PDS 20/20 from 250 msec. up to the full two seconds available. Adjust the **DELAY**

TIME for longer or shorter echoes. Add **REGENeration** for more than one repeat to smooth out the sound.



Infinite Repeat is the ability of the PDS 20/20 to "record" a sound up to two seconds in length and continually play it back like a tape loop. To use the **INFINITE REPEAT**, set the **TIME RANGE SWITCH** to the 2 sec. position, **DELAY TIME** control to high, **REGENeration** control low, and **MIX** as desired. Play a riff in time with the

delay, press the **INFINITE REPEAT** foot switch. The rhythm will now be stored in memory and continue to repeat until the **INFINITE REPEAT** foot switch is pressed again. Note that the **EFFECT** foot switch will bring the rhythm riff back.



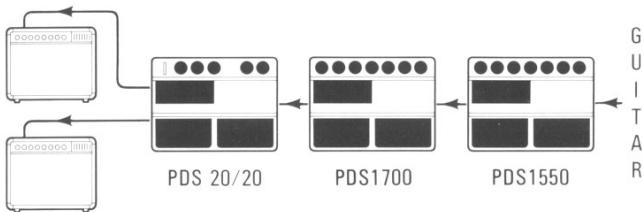
Sound on Sound is achieved with the INFINITE REPEAT foot switch. Put down a rhythm riff as explained above. Turn the REGENERation control all the way up. Press the INFINITE REPEAT foot switch, play a lick that fits the rhythm, and press the INFI-

NITE REPEAT foot switch again. With this method, several tracks may be stored in the memory, however the earlier tracks will be attenuated (reduced) slightly.

A MULTIPLE DIGITECH PEDAL SETUP FOR STEREO

The DigiTech PDS 1550 gives professional control over two switchable distortion effects, the DigiTech PDS 1700 offers a selection of digital flanging and chorusing, and the PDS 20/20

offers additional options of flanging, chorusing, and up to two seconds of full bandwidth delay.



STEREO AMPS

APPLICATIONS

The PDS 20/20 is an excellent choice for adding varying delay effects for virtually any electronic instrument; some of the more popular applications are listed below. Any electronically amplified instrument can benefit from the effects available from the PDS 20/20.

GUITAR:	BASS GUITAR:	KEYBOARDS:
Chorus	Chorus Double	Chorus
Chorus Double	Comb Filter	Leslie Vibrato
Flanging		Flanging
Jet Flanging		Layering
Infinite Repeat		Infinite Repeat
Layering		Echo Repeat
Echo Repeat		Echo
Echo		

CONTROL DESCRIPTIONS

RANGE SWITCH: This switch selects the time range in three increments: 150 msec. to 2 seconds, 19 msec. to 250 msec., and 1.2 msec. to 16 msec.

SPEED CONTROL: The SPEED control adjusts the speed of the sweep; it has no effect when the WIDTH control is full counterclockwise.

WIDTH: The WIDTH control adjusts the amount of variation in the delay time. When fully counterclock-

wise the delay time is set only by the DELAY TIME control. When fully clockwise the delay time changes over a 13 to 1 ratio.

DELAY TIME: The DELAY TIME control sets the average delay of the PDS 20/20; it can be adjusted from 150 msec. to 2 seconds, 19 msec. to 250 msec. or 1.2 msec. to 16 msec. depending upon the setting of the RANGE SWITCH. When the WIDTH control is set fully counterclockwise the DELAY TIME control adjusts the

delay time within the selected range.

REGEN: The REGENeration control adjusts the amount of delayed signal that is returned to the unit and delay again.

MIX: The MIX control adjusts the amount of delayed signal and input signal mixed together. In the fully counterclockwise position (DRY) only

the input signal is presented to the outputs. In the fully clockwise position (WET) only the delayed signal is presented to the outputs. Mixing an equal amount of delayed signal to input signal will result in more pronounced flange, chorus, doubling, echo and delay effects.

INDICATOR LEDS

The INFINITE REPEAT and EFFECT indicator LEDs indicate the status of the unit.

EFFECT: The EFFECT LED when on indicates the PDS 20/20 is active.

INFINITE REPEAT: The INFINITE REPEAT LED indicates the status of the INFINITE REPEAT foot switch. When on, it indicates the PDS 20/20 is in the infinite repeat mode.

JACKS

INPUT: The INPUT jack is an unbalanced connection to the unit, it will accept line or instrument level signals.

OUTPUT: The OUTPUT 1 jack is an unbalanced connection to the unit; it should be used for all mono applications.

STEREO OUTPUT: The STEREO OUTPUT jack is an unbalanced connection to the unit; it is intended to be used in stereo applications, and

consists of the original signal in normal phase mixed with the delayed signal in inverted phase. The result is a swirling stereo effect from a stereo amplifier setup.

POWER: The POWER jack facilitates connection to an A. C. adapter. The recommended adapter is the Digi-tech PS-3. Tip is positive; sleeve is negative.

SPECIFICATIONS

POWER: 9 volt battery (high energy alkaline type is recommended), or PS-3 A. C. adapter.

CURRENT: 35 ma typical.

CONTROLS: RANGE SWITCH, SPEED, WIDTH, DELAY TIME, REGEN., and MIX.

FOOT SWITCH CONTROLS: INFINITE REPEAT and EFFECT.

BANDWIDTH: Dry—20 Hz to 40K Hz. Delay—20 Hz to 16K Hz.

DELAY RANGES: 150 msec. to 2 seconds, 19 msec. to 250 msec., and 1.2 msec. to 16 msec.

SAMPLE RATES: 32.1K hz to 400K Hz.

S/N RATIO: Dry—90 dB. Delay—85 dB.

INPUT IMPEDANCE: 470K ohms.

OUTPUT IMPEDANCE: 4.7K ohms.

WEIGHT: 2.3 lbs. (1.05 kg)

DIMENSIONS: 5" x 6" x 1.9"
(127mm x 152mm x 48mm)

NOTE: When the PDS 20/20 is powered up, the unit will take from 3 to 10 seconds to clear the memory of random data. During this "power up" time the unit will not work.

IN CASE OF **D**IFFICULTY

In the unlikely event that you experience difficulty with the PDS 20/20, please check the battery. Digital signal processors in general draw more battery current and have a shorter battery life than analog processors. A low battery may cause any of the following symptoms: failure of the unit to switch on or off; excessive distortion (clipping) or failure of the unit to produce a wet

signal regardless of the state of the LEDs. In most cases the unit can be restored to proper operation by replacing the battery or by using any A. C. adapter.

Unauthorized repair of the PDS 20/20 by anyone other than the factory voids the warranty. Contact your DigiTech dealer for return/repair procedures.

DOD WARRANTY

1. The warranty registration card must be mailed within ten days after purchase date to validate this warranty.

2. DOD warrants this product, when used solely within the U.S., to be free from defects in material and workmanship under normal use and service.

3. DOD Electronics liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, provided the product is returned through the original dealer, where all parts and labor will be covered up to a period of one year. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.

4. Proof of date of purchase is considered to be the burden of the consumer.

5. If this product is battery operated: Batteries are not covered by this warranty. Please remove weak or dead batteries in order to prevent corrosion damage.

6. DOD reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same on PRODUCTS PREVIOUSLY MANUFACTURED.

7. The foregoing is in lieu of all other warranties, expressed or implied, and DOD neither assumes nor authorizes any person to assume for it any obligation or liability in connection with the sale of this product. In no event shall DOD or its dealers be liable for special or consequential damages or from any delay in the performances of this warranty due to causes beyond their control.

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