

Bei BD80, BD240 & BD320 DIGITAL DELAY PROCESSORS

The BD80/240/320 processors are high quality digital delays with an expandable memory - loop edit facility - synchronised record and playback (sampling) - keyboard control (1 V per octave) - echo - and flanging.

The following is a description of controls and user applications.

When the unit is switched on the LED display will show the maximum delay set for this particular unit for 30 seconds on the BD80 and 60 seconds on the BD240/320. It will then reset to zero.

During this time a delay signal mute circuit is activated while the memory random data is dumped. When the decimal point (to the right of the last display number) appears the unit is ready for operation.

INPUT LEVEL/LEVEL INDICATOR (0-6-15-20)

This control is used in conjunction with the level indicator to set the optimum level for the delay circuitry. The level should be set on Green (-6) for normal programme with occasional peaks showing on Red (0dB). (When using feedback for echo effects or flanging this control may have to be re-adjusted due to the peaks created by the feedback circuit).

OUTPUT LEVEL

This control should be adjusted so that input level is equal to the output level. Thus by switching the Bypass switch the signal levels should be approximately the same. (Levels above or below this may be obtained by varying the control).

On level setting it is important to set the right level carefully as a too low input level (Yellow -20) will degrade signal/noise ratio, and too high a level will cause distortion.

BYPASS SWITCH & LED INDICATOR

Bypasses the delay circuit (unity gain).

MIX CONTROL - DRY DEFEAT - DELAY PHASE

MIX This control mixes varying amounts of Dry and Delayed signal for echo and flanging effects.

DRY DEFEAT SWITCH

Cancels the Dry signal independently of the 'mix' setting. If the dry signal and delay signal are to be mixed at the recording console the mix control can be left in the 'delay' position (or if the Dry Defeat switch is depressed the 'mix' control then acts as a delay level control).

DELAY PHASE SWITCH

Changes the phase of the 'delay' signal (for out of phase effects).

FEEDBACK CONTROL - FILTER - PHASE

FEEDBACK This control sends all or part of the delayed signal back to the input mix circuit to give decaying echo effects, flange tunneling effects and multiple repeats. When the delayed feedback signal level is the same as the input signal a form of 'Hold' will be obtained. Careful input and feedback setting will cause a signal to re-circulate after the input signal is removed.

FILTER When the Filter switch is depressed, every time the feedback signal re-circulates the high frequency is attenuated; thus giving a more natural sound to echoes etc.

PHASE Changes the phase of the feedback signal for additional out of phase effects.

Different flanging sounds are obtained by using the delay phase and feedback phase switches together.

The following is a description of the Control section

SYNCHRONISED RECORD/PLAYBACK & LOOP EDIT & VARIPITCH

Will be explained after a brief description of the control section.

LED DISPLAY

This displays the delay time set in the X1 mode. Maximum display settings are as follows:

	BD80	BD240	BD320
Standard Unit	2047mS	5957mS	8191mS
1 Memory Expansion	4095mS	11915mS	16383mS
2 Memory Expansion	6143mS	17872mS	24575mS
3 Memory Expansion	8191mS	23830mS	32767mS

The four keyboard switches set the displayed delay time. Two are for counting up and two for counting down.

On each there are fast and slow counters. An intermediate speed of count can be obtained by pressing both fast & slow together (up or down)

The decimal point LED gives a visual time indication for synchronising etc (shows start and stop of record/playback in Synchro mode). For example, if the display setting is 1000mS (1sec) the decimal point LED will flash every 1000mS.

X2 SWITCH

This switch gives displayed delay X2 but will also reduce the bandwidth of the delayed signal by half ie

BD80	2047mS @ 15kHz (x1)
	4095mS @ 7.5kHz (x2)
BD240	5957mS @ 18kHz (x1)
	11915mS @ 9kHz (x2)
BD320	8191mS @ 15kHz (x1)
	16383mS @ 7.5kHz (x2)

OSCILLATOR - LED - SPEED - DEPTH

This switch enables an oscillator circuit to sweep the delay time up and down continuously for Chorus, ADT and Flanging Effects.

The LED above the switch gives a visual indication of the set speed.

SPEED / sets the rate the delay is increased/decreased

DEPTH sets the amount the delay is increased/decreased

The following are best considered as MEMORY FILLING CONTROLS (RECORD) and MEMORY EMPTYING CONTROLS (PLAY)

SYNC - START/STOP - HOLD - PITCH CONTROL

These switches and controls are used in conjunction with each other.

SYNC This switch changes the operation of the unit from continuous memory fill and re-fill (Record/Play) to a Record (memory fill & stop) or Playback (memory empty and stop) situation dependent on delay setting

START/STOP SWITCH

When depressed once the memory fills to the set display time and automatically stops (Record - indicated by decimal point LED off and on)

In this mode the contents of the memory are retained as long as the Start/Stop button is not depressed again. If the Start/Stop is depressed again the contents of the memory are played and if a signal is present at the input to the unit the memory is filled again (Record) but with new information.

If the memory contents are to be retained for playback more than once the HOLD button must be depressed. Each time the Start/Stop switch is depressed it will play the same memory contents and stop. If the Sync switch is now released the memory contents will form a loop; continuously playing the information recorded (HOLD SWITCH MUST STILL BE ON).

THE START/STOP FEATURE CAN BE TRIGGERED EXTERNALLY BY AUDIO SIGNAL FED INTO TRIGGER 2 SOCKET ON REAR PANEL OR VIA KEYBOARD.
See CV Socket details.

HOLD SWITCH & PITCH

If the 'Hold' switch is depressed when the memory is filling and refilling the contents of the memory at the particular time of depressing the Hold switch will be retained, and it will continuously play the same signal.

The pitch of the retained information can then be varied using the pitch control. To pitch 'up' record in X1 delay mode and vary pitch control; to pitch 'down' record in X1 delay mode, switch to X2 delay and vary pitch control.

The Varispeed (pitch control) can also be used with the Sync - Start/Stop controls.

SYNCHRONISED RECORD & PLAYBACK

To 'RECORD', switch the sync on and when the decimal point is stationary it is ready for recording. Set record time on display.

Switch to 'Bypass' and listen to 'real time' signal. When 'record' is to start, depress Start/Stop once. (Decimal point goes out and comes on at the end of the recording time.)

Depress the HOLD switch.

To PLAYBACK, switch from 'Bypass' to 'Delay' to listen to 'Delayed' signal. Depress Start/Stop switch. The information recorded previously will now be re-played in synchronisation (ie Playback will start at exactly the same point as the record.)

Each time the start/Stop switch is depressed it will play back the recorded information and then stop. Continuous playback can be obtained by switching 'off' the Sync. The information is now in a loop and can be 'edited'.

LOOP RESET SWITCH (Normal/Reset)

This switch allows the recorded loop to be re-triggered (in Sync mode) each time either the manual start/stop switch is depressed or via the audio trigger.

Once triggered, each time the unit is re-triggered the loop will reset to the beginning and start again.

RECORD

In the 'record' mode the 'reset switch' must be in the 'normal' position.

PLAYBACK

In 'normal' position will replay the loop length (dependent on display setting) and then stop. Re-triggering will have no effect until the end of the loop.

In 'reset' position it will reset the loop to the beginning on each trigger.

TRIGGER SELECT SWITCH (Internal/Off/External)

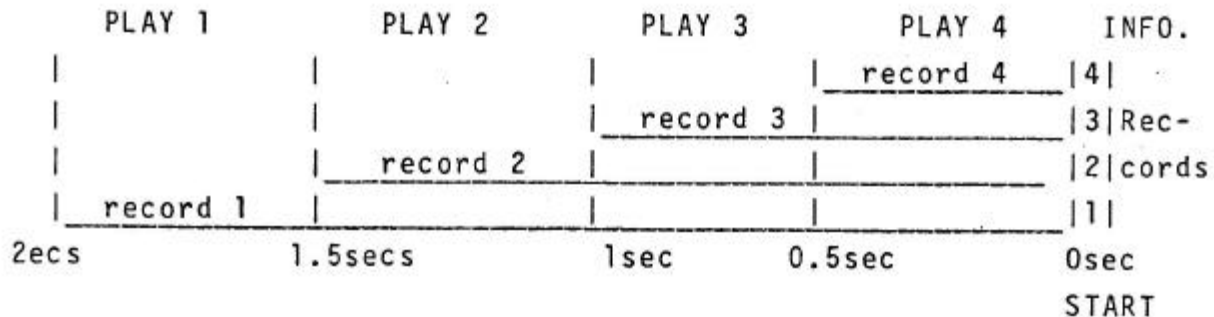
'Centre' position is 'Off' (No audio trigger). 'Internal' position connects the audio signal at the input via the input level control to the audio trigger circuit. Thus, for 'playback' audio trigger purposes the input level acts as a 'Threshold' control. 'External' position connects the Trigger 2 input socket on the rear panel to the trigger circuit directly.

NB The 'manual' trigger will always override the audio trigger.

EDITING: By now using the 'down' fast or slow keyboard switches the information can be EDITED (much the same as cutting recorded Tape.) By switching the Sync switch 'on', the edited information can now be re-played each time Start/Stop is depressed.

RECORD/PLAYBACK ON DIFFERENT PARTS OF LOOP

- 1 Set display time to eg 2secs (2000mS)
- 2 Set the unit for Syncro Start/Stop Record
- 3 Start/ Record 2secs of signal / stop.
- 4 Set display time to 1.5secs
- 5 As (3) with new signal 1.5secs (plays back previous signal recorded and records over 1.5secs with new signal.)
- 6 Set display time to 1sec
- 7 As (3) new signal 1 sec.
- 8 Set display time to 0.5secs
- 9 As (3) new signal 0.5secs
- 10 Depress Hold switch
- 11 Set display for 2secs
- 12 Press Start switch / Plays back
 - 0.5secs of Record 1
 - 0.5secs of Record 2
 - 0.5secs of Record 3
 - 0.5secs of Record 4
- 13 Switch sync 'off' for continuous loop for editing.



NOTE:

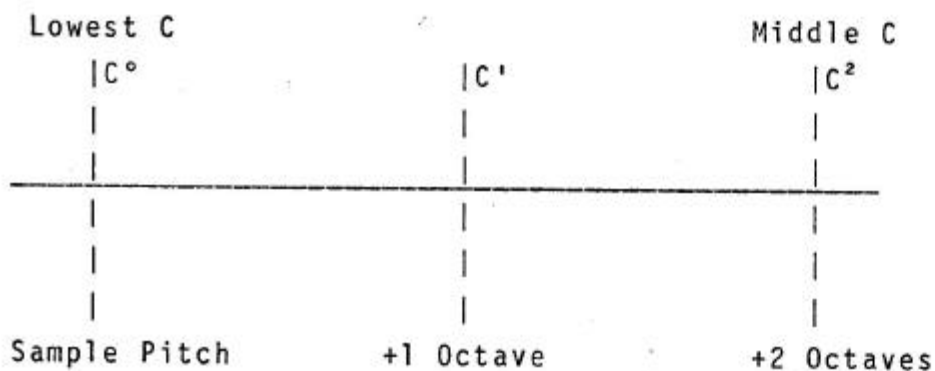
If the displayed time is decreased:

(a) the information above the displayed time is automatically retained and can be replayed by **increasing** the display time back to the same point (Sync or Hold must be depressed when increasing).

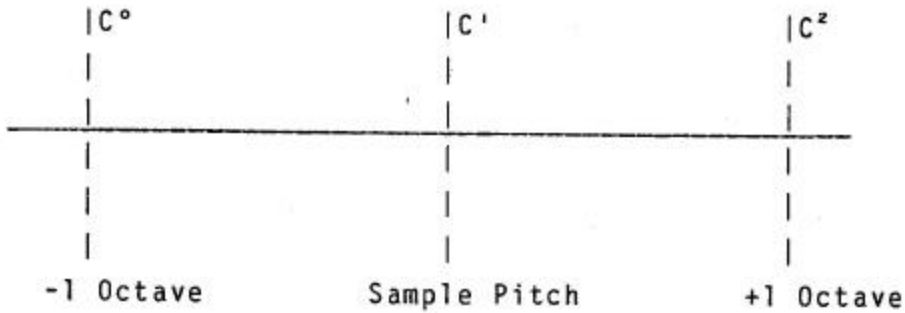
(b) The Hold switch does not have to be depressed to retain information above LED display setting, but Sync or Hold must be depressed when increasing delay time to retain information.

CV SOCKET

- 1 Sample a sound into the memory
- 2 Connect CV and trigger to CV and Trigger 1 inputs
- 3 Select RESET and SYNC (via front panel switches)
- 4 Press the lowest C (C^0) on keyboard. This will trigger and play memory contents at the same pitch. (If slightly higher, this means the lowest C is not 0V. This does not matter as will be explained later. See 8 and 11)
- 5 Press the next C (C^1). This will trigger and play the memory one octave up.
- 6 Play C^2 - this will trigger and play the memory two octaves up.



- 7 Selecting X2 will shift the sample pitch position to C'.
(Reduced bandwidth applies.)

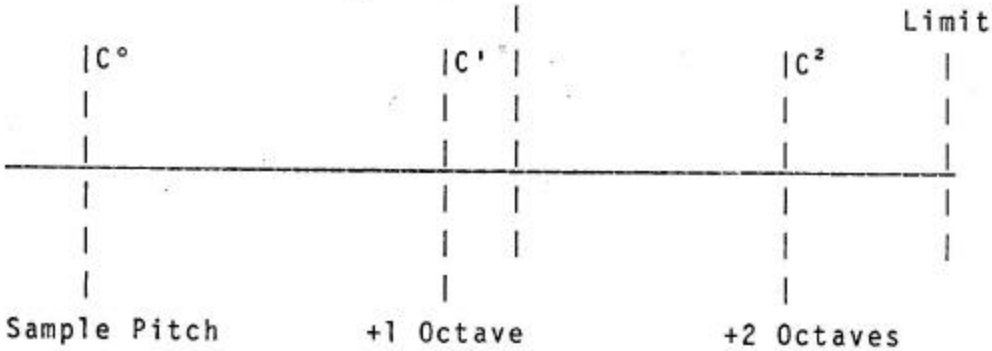


- 8 To sample and play the same pitch if lowest C is not 0V, play the lowest C (This sets the record pitch.) Go through procedures 1 and 3. When you play lowest C (C°) pitch will be the same as recorded pitch.

- 9 Pitch control on front panel has a one octave up range. This enables you to 'tune' memory pitch to keyboard pitch or any other instrument pitch. You can also shift the play pitch down one octave (x½ memory).

- 10 The limit of 'play' pitch is just over 2 octaves up. Turning 'pitch' control to maximum brings the limit to here

(C° IS THEN +1 Octave
and C' is +2 Octaves)



13 Using this variation of record pitch you can overdub different pitch samples.

14 INPUTS

CV = Keyboard CV output

TRIGGER 1 = Keyboard gate output/drum machine output

TRIGGER 2 = External audio selected via front panel switch.

OVERDUB (Superimpose)

Record first sample normally, ie SYNC/START

Leave SYNC button in

Record 2nd sample by pressing start button after setting feedback control Approximately $\frac{2}{3}$ (ie 2 o'clock)

Leave SYNC button in

Record 3rd sample as 2nd.

Adjustment of input level and feedback level will give varied level to old/new samples.

When completed press HOLD to retain or press HOLD each time you listen to recorded samples.

(Don't forget to release hold when overdubbing new sample).

REAR PANEL CONNECTIONS (all 1/4" jack)

CV & TRIGGER 1 SOCKETS: For connection to CV & Gate on a keyboard (1V/octave)

TRIGGER 2 SOCKET: External audio trigger (selected via front panel switch).

INPUT Balanced(to unbalance connect shield and ring on input jack)

DIRECT OUT Dry only output (unbalanced)

DELAY OUT Delay only output (unbalanced)

MIX OUT Mixed signal dry and delayed (unbalanced)