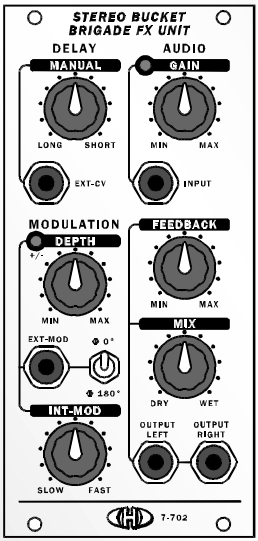
Modular system

Stereo Bucket Brigade FX Unit

Module 7-702 v. 1.0



USER GUIDE

Content

This manual and other documentation are also available at : www.chd-el.cz

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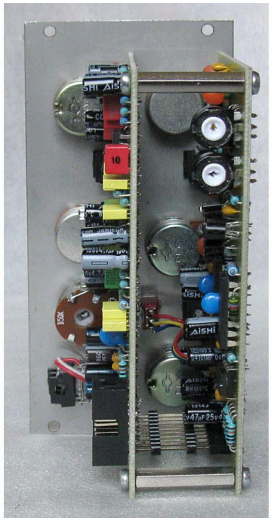
1. MAIN FEATURES

- Two genuine analogue BBD circuits (2x 1024 stages)
- Stereo output (incl. switchable modulation phase)
- Internal LFO
- Mixed output with “Dry / Wet” audio signal ratio control
- External control of Delay length and modulation
- Chorus, Phaser, Flanger, Vibrato, Chorus/Vibrato effects
- Stainless steel front panel
- Pure analogue circuitry (no DSP technology used)
- Fully hand-made – each module tested and adjusted individually




OUR MISSION

Do things different
Always offer something unique and innovative not available on the market so far.

No compromises in the circuitry design
Don’t give up the sound quality for cost driven compromises.

Classic design and hi-end components
For long live and better serviceability of the devices.

Hand made in Europe
Each unit is hand made and individually adjusted for highest quality control.

2. MODULE FUNCTIONS

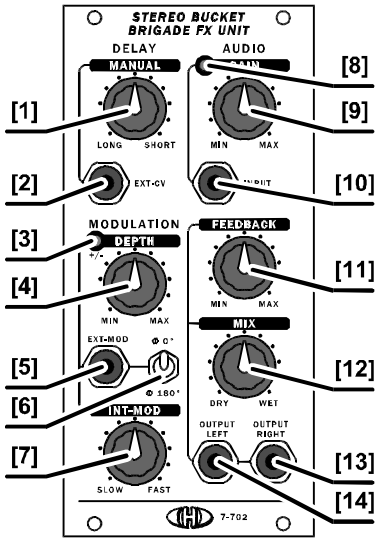
Stereo Bucket Brigade FX Unit module is designed for Eurorack modular synthesizer systems. All controls, signal inputs and outputs are located on the front panel (see Fig. 1). Inputs and outputs use standard mono 3,5 mm (1/8“) mini-jack patch connectors.

DELAY block:
- [1] MANUAL – manual control
- [2] EXT-CV – external CV control input

MODULATION block:
- [3] +/- – modulation indicator
- [4] DEPTH – modulation depth control
- [5] EXT-MOD – external MOD control input
- [6] Φ 0° / Φ 180° – modulation signal phase
- [7] INT-MOD – internal LFO speed

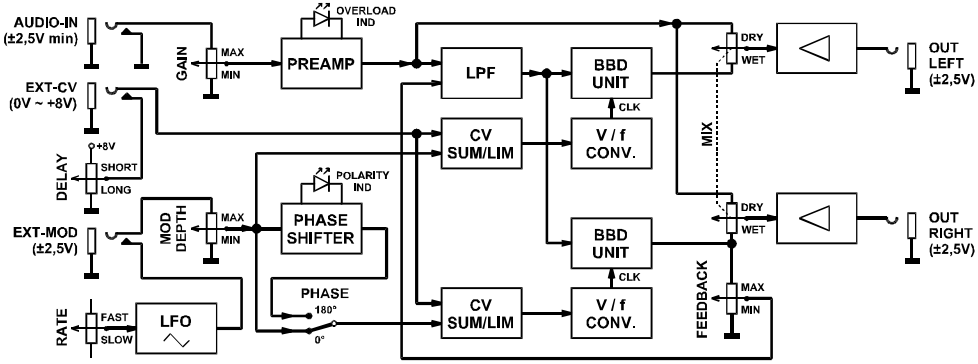
AUDIO block:
- [8] OVERLOAD – overload indication
- [9] GAIN – input gain control
- [10] INPUT – audio signal input
- [11] FEEDBACK – feedback level
- [12] MIX – wet / dry signal ratio
- [13] OUTPUT-RIGHT – right audio channel output
- [14] OUTPUT-LEFT – left audio channel output

Fig. 1 – Module front panel



Stereo Bucket Brigade FX Unit is based on 2 analogue delay circuits (BBD). The scheme in Fig. 2 shows the internal block structure of the module. The module is designed for stereo Ensemble, Phaser, Chorus, Flanger and similar effects. The resulting effect depends on input voltage controls and knob settings.

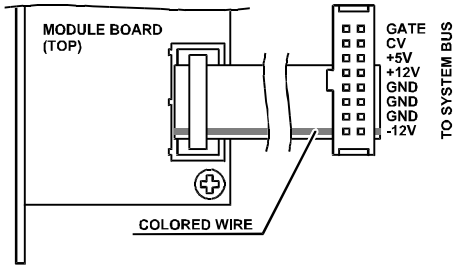
Fig. 2 – Block scheme



3. CONNECTION THE MODULE TO THE SYSTEM

To connect the module, plug carefully the supplied ribbon cable into the bus socket of your modular case. **The colored marking of the ribbon cable must be at the bottom of the bus connector!** Failure to check this may result in the module or case PSU damage! (module is not protected against permanent incorrect polarity).
The module uses ±12V of the system only (pins Nr. 1 to 10), GATE, CV and +5V signals are not used (see Fig. 3).

Fig. 3 – Bus board connection



4. OPERATION

The controls and inputs/outputs are divided in three function blocks: “AUDIO”, “DELAY” and “MODULATION”.

4.1. “AUDIO” BLOCK

The Audio block processes analog audio signals. Input signal is connected to AUDIO-IN [10] input, the minimal input signal level for full gain is ±2,5 V_{PP}. Optimal input gain level is adjustable by GAIN [9] potentiometer so input voltage amplitude can be higher than ±2,5 V_{PP}. The indication LED OVERLOAD [8] should shortly blinked at maximum input signal level. If the LED lights permanently, the input levels of BBD lines are overloaded and the audio signal is distorted thus.
The module outputs stereophonic signal – there are two audio outputs available OUTPUT-LEFT [14] a OUTPUT-RIGHT [13]. Both outputs provide a signal of max ±2,5 V_{PP} amplitude (accordingly to the input signal levels and panel controls settings). This signal level conforms to standard input level +4 dB of professional amplifiers, mixers etc.
Both outputs have a mixed Dry (input) and Wet (BBD liens) signals. The required ratio of these signals can be adjusted by MIX [12] potentiometer. In the left (DRY) position the input signal remains unaffected, hence in the right (WET) position, the output signal comes solely from the analogue delay lines.
It is possible to input the delayed signal from the BBD lines back at their inputs with the FEEDBACK [11] potentiometer. The left position (MIN) eliminates the feedback completely, while the right position (MAX) comes up to self-oscillation.

4.2. “DELAY” BLOCK

Basic time of the analogue delay lines is manually controllable by MANUAL [1] knob from approx. 4 ms (SHORT) to 25 ms (LONG). If the patch lead is connected in EXT-CV [2] input, the potentiometer of the manual control is automatically disconnected and the delay length is controlled by external control voltage. For full parameter range control, the external control voltage should be in the range of 0 to +8 V. The lower control voltage enables longer delay time (0 V for LONG, +8 V for SHORT).

4.3. "MODULATION" BLOCK

Basic delay time can be modulated by internal LFO or external modulation source.
If there is no jack cable inserted in EXT-MOD [5] input, the delay time is modulated by internal LFO with triangle waveform. The speed of internal LFO can be set by INT-MOD [7] knob, in the range of approx. 0,15 to 20 Hz.
If there is a patch lead inserted in EXT-MOD [5], internal LFO is automatically disconnected and the delay length is modulated by external control voltage. For full modulation range, the external control voltage should be in the range of min. ±2,5 V_{PP}. External modulation source can have any frequency and shape.
The phase of the modulation can be set for both internal and external modulation signal with the Φ 0° / Φ 180° [6] switch. The resulting stereo effect is affected. In Φ 0° position, the modulation signal is the same for both analogue delay lines (i.e. left and right channel is modulated the same way). In Φ 180° position, the modulation signal is inverted for one of the delay lines (i.e. modulation of the left and right channels are in opposite phases).

5. USER SETTING EXAMPLES

The table bellow shows the examples of approximate knob settings for typical effects. The examples do not include external control of the module (inputs EXT-CV [2] and EXT-MOD [5] are not used here).

Effect	Knob settings				
	Manual (Dly) 0% = Long 100% = Short	**Mix** 0% = Dry 100% = Wet	**Feedback** 0% = Min 100% = Max	**Int Mod Rate** 0% = Slow 100% = Fast	**Mod Depth** 0% = Min 100% = Max
Chorus	0% ~ 50%	50%	0%	50% ~ 100%	50% ~ 100%
Phaser	100%	25% ~ 75%	25% ~ 60%	25% ~ 75%	25% ~ 100%
Flanger	50% ~ 100%	25% ~ 100%	25% ~ 60%	40% ~ 60%	25% ~ 100%
Jet Flanger	0% ~ 90%	25% ~ 100%	80% ~ 100%	40% ~ 60%	75% ~ 100%
Vibrato	25% ~ 100%	100%	0%	75% ~ 100%	50% ~ 100%
Dry Hall	0%	50%	25% ~ 60%	Not relevant	0%
Chorus – Vibrato	0% ~ 25%	100%	50% ~ 75%	75% ~ 100%	75%

6. TECHNICAL PARAMETERS

Mechanical dimensions

Module width :	12 HU (60,5 mm)
Module height :	3 U (128,5 mm)
Module site depth :	64 mm (without power supply cable)

Power supply

Supply voltage :	±12 V from the system bus
Current requirement :	max +55 mA / +12 V
	max -25 mA / -12 V

Inputs / outputs

Inputs:	AUDIO-IN → min ±2,5 V_{PP} for full driving / Z_{IN} = 10 kΩ
	EXT-CV → 0 to +8 V for full driving / Z_{IN} = 10 kΩ
	EXT-MOD → min ±2,5 V_{PP} for full driving / Z_{IN} = 10 kΩ
Outputs :	OUTPUT-LEFT → ±2,5 V_{PP} / Z_{OUT} = 200 Ω (conforms to standard level +4 dB)
	OUTPUT-RIGHT → ±2,5 V_{PP} / Z_{OUT} = 200 Ω (conforms to standard level +4 dB)

Accessory

Ribbon power supply cable with 10 / 16 pin connectors, length ca 200 mm

7. WARRANTY CONDITIONS

The equipment is provided with **thirty-month warranty** starting from the date of the equipment take-over by the customer. This date must be specified on warranty list together with dealer's confirmation. During this period of time, all defects of equipment or its accessories, caused by defective material or faulty manufacturing, will be removed free of charge. Warranty repair is asserted by the customer against the dealer. Warranty period is to be extended for the time period, during which the product was under the warranty repair. The relevant legal regulations take effect in case of cancellation of purchase contract.

The customer will lose the right for free warranty repair, if he will not be able to submit properly filled out warranty list or if the defects of the product had been caused by:

- unavoidable event (natural disaster),
- connecting the device to the incorrect supply voltage,
- inputs or outputs overloading by connecting the signals source or load source with not-corresponding characteristics etc.,
- faulty equipment operation, which is at variance with the instructions referred-to in the operating manual,
- mechanical damage caused by consumer during transportation or usage of equipment,
- unprofessional interference with the equipment or by equipment modification without manufacturer’s approval.