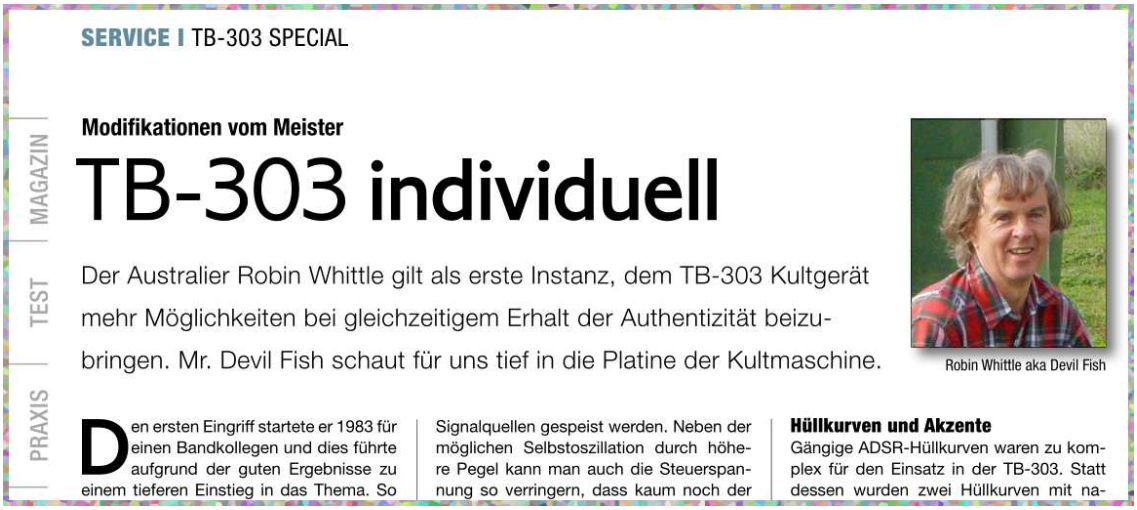

SERVICE I TB-303 SPECIAL

PRAXIS | TEST | MAGAZIN

Modifikationen vom Meister

# TB-303 individuell

Der Australier Robin Whittle gilt als erste Instanz, dem TB-303 Kultgerät mehr Möglichkeiten bei gleichzeitigem Erhalt der Authentizität beizubringen. Mr. Devil Fish schaut für uns tief in die Platine der Kultmaschine.

Robin Whittle aka Devil Fish

Den ersten Eingriff startete er 1983 für einen Bandkollegen und dies führte aufgrund der guten Ergebnisse zu einem tieferen Einstieg in das Thema. So

Signalquellen gespeist werden. Neben der möglichen Selbstoszillation durch höhere Pegel kann man auch die Steuerspannung so verringern, dass kaum noch der

**Hüllkurven und Akzente**
Gängige ADSR-Hüllkurven waren zu komplex für den Einsatz in der TB-303. Statt dessen wurden zwei Hüllkurven mit na-

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Author: Ulf Kaiser  Translator: Ine Gundersveen http://www.firstpr.com.au/rwi/dfish/

**Modifications from the master**

# TB-303 individual

*The Australian Robin Whittle counts as the first to bring new features to the TB-303 "cult-gear" while simultaneously preserving its authenticity. Mr Devil Fish looks deep into the circuit-board of the cult-machine for us.*

He started his first modification in 1983 and because of the good results this lead to a longer voyage into the topic. This is how the most well-known modification to the TB-303 came about. The Devil Fish is built as two daughter-boards, and in 1996 the modifications were updated with 32 additional memory banks, and MIDI-In was added in 2004. To date about 253 modifications have been made, and Whittle estimates that this is about 1/50 of the TB-303s which probably still exist.

**The sequencer and synthesizer of the TB-303**

The pattern sequencer with a song-linking option is based on the non-modifiable factory programme of an NEC 4-bit Microcontroller which uses a 6-bit-DA converter to generate the control-voltage for the oscillator. It can transpose one octave up and down in each pattern, in addition to up to 12 semitones in playback. It also produces switching signals for Gate, Accent and Slide. The synthesizer has only a single oscillator; the TB-303 makes its magic with relatively simple circuitry.

**The signalling pathways**

The unusual filter with its imprecise characteristic remains the central element of the TB-303. The original diode-cascade filter reminds one of the Moog-cascade but has, as already described, had new circuits added. This filter is in the Devil Fish basically unchanged but can be fed more source signals in an extended range of levels. Apart from the

possible self-oscillation using higher levels of resonance, it is also possible to reduce the control voltage enough to prevent the oscillator's first harmonic from passing through the filter. A small right-turn on the Cut Off knob and the monster's head slowly appears from the swamp ... The TB-303 filter contains a soft-clipping which is negligible in the original but is clearly noticeable when using the modification's Overdrive control. Here, the levels are increased well beyond the original specification and the nonlinear behaviour of the diodes are audible, more drastically than in the Minimoog for example. At the end of the signalling pathway of the TB-303 you find a high-value VCA. Robin Whittle has added a number of switchable components in the Devil Fish: there are, for instance, two mufflers for soft-clipping.

**Envelopes and accents**

Regular ADSR envelopes were too complex for use in the TB-303. Instead, two envelopes with an almost immediate positive edge and a naturally fading decay were used. The volume envelope generator controls the VCA with a constant decay-timer which in the Devil Fish is adjustable in a range from 16 ms to an almost complete sustain level. The main envelope generator and the accompanying circuits must be the most unusual parts of the synthesizer. The main envelope influences the filter-frequency. In the original, the decay for notes without accents was variable between 200 ms and 2 seconds. For accents, the decay was set to 200 ms. In the Devil Fish, both times are variable between 30 ms and 3 seconds. In the original the influence of the main envelope can't be switched off completely, while in the Devil Fish the control range is expanded in both directions. A typical modulation envelope would automatically increase the length of the filter modulation at higher values. To avoid this Roland developed a unique circuit which opens the filter wider with increased modulation values while allowing simultaneous faster closure. A second and equally significant function of the envelope contributes to the 303-sound: for accented notes only, the main envelope signal is directed via the Accent control. This signal controls two circuits: The first signal path smoothes the attack phase and is added to the volume envelope. The VCA responds to the increased levels with a short level increase. The second signal path is connected to the resonance parameters and results in a 200 ms steep lasting increase in filter frequency. The familiar "Wow!" is reached when the resonance is turned clockwise and causes the resonance filter to quickly open and close. The accompanying compensator (capacitor C13) does not get completely discharged by rapid accent sequences. Accordingly, there is a displacement on the next accent which opens the filter further. The silver box screams ever more intensely. The Devil Fish allows the accent sweep to be turned off or the effect to be even more intense.

**Further modifications to the Devil Fish**

The Devil Fish 303 makes slower slides possible and one can activate the accent in real-time via a push-button. There is adjustable filter-tracking for the pitch, filter-FM, and a pre-VCA filter output. In addition there is soft-attack which subdues the volume envelope attack on the VCA. The Devil Fish finally offers CV/gate inputs for the pitch, and control input for the filter frequency, gate, accent and slide.