

# REAL WORLD INTERFACES

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## **TR808 21 Banks Of Memory, Sound Controls and 4 Level Accent system**

808-old-mods-2006.pdf For the 1980s Memory system with LED digit display.

(With updates from December 2010 about using a lithium battery and using pots instead of toggleswitches and trim pots for the Tom / Conga Decay functions.)

### ***Pots can be damaged!***

The Bournes conductive plastic pots used in these modifications are very high quality and have an indefinite life, unless they are subject to excessive force against the shaft. This will destroy the pot.

These pots can be tricky to obtain and replace, though Element14 (previously Farnell) stocks them. Please always pack the machine so the pots never have any force on them.

### **Memory FUNCTION**

The standard TR808 remembers 16 patterns (each with parts A and B) and 12 tracks. For each pattern, in addition to the drum beats, it remembers the length of part A and part B (set to 16 and 0 respectively when the pattern is cleared) and the "pre-scale" time signature.

For each track - or rather each of 12 starting points in its track memory - it remembers a length, which points to the last pattern position in the track. This information, stored in battery backed up memory, constitutes one "bank" of memory - the total data storage of a standard TR808.

This modification provides 21 separate banks of memory - 20 new banks. Unfortunately there is no practical way of saving the memory contents to MIDI or cassette.

### **CONTROLS**

There are two pushbuttons which drive a 0 to 9 counter, and an LED digit display to indicate the state of the counter. Below that is a three position toggleswitch. In the centre position, the standard memory bank is selected - the number has no effect.

In the left position, one of ten new banks is selected. Likewise, the right position selects another ten new banks.

A toggleswitch above the display has two functions.

In the right position, writing is possible and there is no automatic resetting of the TR-808's CPU when the counter or the left-centre-right toggleswitch is changed. This enables the switching of patterns in the midst of patterns, since the CPU reads its notes from memory just before each beat. This enables a direct, hands-on, style of playing by switching between the same pattern number in different memory banks. This is intended for pattern play - not for playing tracks.

In the centre position, writing is enabled and there is an automatic reset system so that any change to which bank is selected will cause the CPU to be reset. For normal operation, it is vital that the CPU "wake up" in the memory bank - which is the only time it reads the lengths, prescales and track length values..

In the left position, the same reset system works, but writing is disabled.

## **BATTERY BACKUP**

The TR808's memory is powered by three AAA batteries in a battery compartment. Alkaline batteries should last for several years since the total current drain is about 10 microamps, and is unlikely to exceed 20uA. An alkaline AA battery has about 2850 mA hours, so at 20uA would last for about 16 years, theoretically.

(Note, Dec 2010: I would install a lithium battery now, which is much more reliable than relying on three AA batteries and their contacts for memory backup.)

## **Four Level Accent system**

The Accent modifications on the left give you four levels of accent, for:

Highest knob: Accent and Cowbell

Accent

Cowbell

Lowest knob: Normal

Each knob selects the trigger level (~3.5V to ~14.5V), which can be lower than normal (5V). The lowest level produces little or no sound for various drum channels. Some of the drum channels have different threshold voltages below which they do not produce any sound. The HandClap is generally insensitive to the trigger level. (The lowest voltage is adjustable internally via a trimpot which is mounted on the lowest pot.)

Below that is a toggleswitch which enables the new system (left) or the original accent system (right).

Irrespective of the position of the toggleswitch, the two pushbuttons on the left are to override the instrument select so you can program Accent or Cowbell. This makes it a lot faster to program the accents. The machine can still operate normally - the toggleswitch selects ordinary accents when in the right position.

# **TR808 SOUND CONTROLS**

## **CONTROLS**

From top to bottom, the new sound controls are:

Red knob	Snare tuning - High component	Left is normal
Orange knob	Snare tuning - Low component	Left is normal
Toggleswitch	Soft attack for Cymbal	Left is normal
Trimpot Trimpot Trimpot	Decay controls for high, medium and low Toms/Congas. These pots are adjusted with a small screwdriver.	Clockwise is normal
Toggleswitch	Turns off Hand Clap "Reverb"	Left is normal
Yellow knob stronger	Hand-Clap presence	Clockwise makes HCP
Grey knob	Noise control	Clockwise increases noise component of Snare, Toms and Hand-Clap

## **SNARE TUNING**

There are three components to the snare sound - a pulse of high-pass filtered white noise which is controlled by the Snappy pot, and two decaying sine wave tones at about 250 and 500 Hz. The Tone pot fades the output between the low part (full anti-clockwise) - and the high part (full clockwise). The top two pots - with red and orange knobs allow you to individually tune each of these tones down by up to an octave. In addition the tonal part of the snare sound is permanently boosted to give it more punch at the lower pitches, and the mid and low frequency content of the noise is increased. Normally there is a soft attack on the noise component, but I remove this so there is a sharp attack in the modified machine.

## **CYMBAL SOFT ATTACK**

This switch causes the normally rather aggressive fast attack cymbal to have a quieter attack section followed by a smoother main body of sound. This sounds best with the tone control in the centre.

## **TOM DECAY**

The standard Roland Tom sounds are long and impressive, but can clutter up fast pieces of music. These three trim pots allow normal or shortened decay for each of the three Tom/Conga channels. You can select the shorter decay time of your choice by adjusting each trim pot - insert a small screwdriver in the hole on the side of the machine. The Conga sound is purely a decaying sine tone while the Tom sound has an additional pulse of filtered white noise to give the illusion of the complexities of a vibrating drum skin. As

part of the modifications I permanently shorten this pulse, so that it is not so noticeable at the end of the sound, and so it is not too prominent when the level of the internal white noise generator is increased.

(Note, December 2010: In the two or three machines I have done these mods for since the late 1980s, I replaced the toggleswitches and trimpots on the side with small ALPS pots similar to those I use in the Devil Fish. This means the Tom / Conga Decay is always controlled, between normal and quite short, by a pot for each of the three Tom / Conga channels.)

## **HAND-CLAP CONTROLS**

The hand clap density pot (with a yellow knob) gives you access to what is normally an internal adjustment. The Hand-Clap sound is composed of two filtered pulses of white noise, the most prominent of which is a group of three or four short pulses of spikes. You can control the density of these spikes from none, to a few thin ones (a distant "Hand-Clap"), to quite a lot (normal), to so many that the short pulses fuse into one rather nasty big pulse. The other component of the sound - a smoothly decaying pseudo-reverb sound - is unaffected. With the yellow knob turned fully to the left this is all you can hear, and it can be quite a pleasant sound on its own. When the toggleswitch above the yellow knob is in the right position, the reverb part of the sound is removed, so the Hand-Clap sound is abrupt.

## **NOISE CONTROL**

The pot with the grey knob gives you access to what is normally another internal adjustment - the level of the internal white noise source. Therefore this control affects simultaneously the Snare, Tom and Hand-Clap sounds. As it is turned clockwise the Snare and Hand-Clap sounds get spikier and have longer fizzier endings. The Toms gain quite a rumble when the noise level is increased.

## **ALTERNATIVE NOISE INPUTS**

The Alternative Snare Noise Input (the leftmost 6.5mm jack - just beneath the orange knob) allows an external line level signal between 200 mV and 5 V to take the place of the internal white noise source as far as the snare circuit is concerned. A distorted and filtered version of your input signal is therefore present in the Snare sound. You may feed in your own noise of electronic or physical origin, your voice or tonal sound from keyboard instrument.

The centre 6.5 mm jack is the Alternative Hand Clap Noise Input which only affects the Hand Clap and Maracas sounds. Feeding a keyboard chord into this input gives you a "Tonal Handclap" sound - a tonal punch that is part of the rhythm.

The Alternative Cymbal Source Input (rightmost 6.5 mm jack - just below the red knob) allows an external line level signal to be used as the basis of the Cymbal and Hi-Hat voices instead of the internal source of six square wave oscillators. Feeding this input with melodies and chords from a keyboard with lots of high frequencies gives rise to shimmering tonal pseudo-cymbal sounds. I have driven this input with the sounds of a real cymbal being hit softly with a mallet - with a microphone plugged into a tape deck, and the line out of the tape deck driving the cymbal alternate input. By experimenting with the output level and manner of striking the cymbal, I was able to get a realistic sound.