

# REAL WORLD INTERFACES

## Devil Fish modified TB-303 with the Sequentix MIDI In and Out system

Robin Whittle 13 May 2013 <http://www.firstpr.com.au/rwi/dfish/>

This Devil Fish has a **Sequentix MIDIBass 303 Mk II-e** MIDI In and Out interface. For full details of this, please see Colin Fraser's site: [http://www.sequentix.com/sq\\_mb303.htm](http://www.sequentix.com/sq_mb303.htm)

In May 2013, the **User Manual** was: <http://www.sequentix.com/mb303/mb303-2-manual.pdf> (V2.0 2009-10-13). For a comparison of the features of this system with those of the Devil Fish MIDI In/Out system and the Quicksilver 303 CPU replacement, please see: <http://www.firstpr.com.au/rwi/dfish/midi-options/>

Like the Devil Fish MIDI In/Out system this interface uses the TB-303 CPU's internal sequencer, which can use the 32 Bank Memory system: <http://www.firstpr.com.au/rwi/dfish/DF-32-Bank-Mem-Manual.pdf>

### Connections

**MIDI IN** is via the Sync socket – just plug the MIDI lead into the socket. Normally, a MIDI In socket has its centre pin (number 2) open circuit. This means there is no electrical connection between the MIDI Out driving device and the receiver, except for the two signal pins which drive a LED in an opto-isolator in the receiving device. The purpose of this isolation is to avoid ground noise problems, which can be difficult to understand and fix.

In the TB-303, this pin is connected to ground via a 22 ohm resistor. This is required to provide a reasonably low impedance ground connection for when the socket is used as a Sync socket. However, the 22 ohm value is high enough to reduce the impact of ground noise voltages from the MIDI Out driving device on the ground of the Devil Fish. If you find there are such noises, as might occur due to capacitive coupling of noise to an ungrounded laptop PC and its MIDI Interface, you should be able to resolve these problems by modifying the MIDI lead so it has no centre pin at the Devil Fish end. The same immunity from ground noise due to the device which sends MIDI to the Devil Fish can be achieved by sending the MIDI signal through the Sync Lead (as described below), since it only connects pins 4 and 5 of the MIDI lead to the Sync Socket.

**MIDI OUT** is via a special short adaptor lead, with a 3.5mm stereo plug and a 5 pin DIN line socket. This plugs into a 3.5mm socket mounted between the Sync socket and the Tuning knob. The connections for that socket are:

Function	3.5mm socket	DIN socket
Pullup to +5V	Tip	Pin 4
Ground	Body	Pin 2
Active low signal pull down to ground.	Ring	Pin 5

## Default MIDI Reception Behaviour

The MIDIBass 303 has no indicator lights or front panel controls. The behaviour of the interface can be altered via sending System Exclusive and Control change commands to it via MIDI In. These are described in the Sequentix User Manual. Many MIDI sequencer programs enable the creation of System Exclusive commands. However, you will need suitable skills to do this, since the commands are usually specified in hexadecimal format.

Here is a description of the behaviour of the interface in its default state – as we supply it in the Devil Fish and as it is without sending any SysEx commands to it.

**Reception of MIDI Sync** is on by default. Incoming Start, Timing Clock and Stop commands will control the internal sequencer and drive the Run/Stop and Clock pins of the Sync socket.

The **receive channel** for notes and control changes defaults to **1**.

**Note reception is on by default**, with the lowest C (one octave down from the TB-303's lower C button) being MIDI note 45 (C2) and the highest being MIDI note 100 (E6), which is 4 semitones above the highest output of the TB-303's internal sequencer. The pitch tracking of the VCO is not necessarily accurate above C6.

An **Accented note** will be played if the received note velocity is 101 to 127.

A received note will be played with **Slide On** if it starts while another note is still on. This will not generate a new Gate signal. The Gate signal will remain on and the CV to the VCO (and output from the TB-303's CV Out socket) will slide to the new note's voltage, according to the Devil Fish's Slide pot. See the Sequentix User Manual regarding using Controller 65 to directly control the Slide.

Reception of **Controller 1** (Mod Wheel) drives the Filter Frequency. When the machine is turned on, this drive is not enabled. Once a Controller 1 message has been received, it is turned on and can drive the Filter Frequency higher or lower than it would otherwise be. Like the Devil Fish MIDI In system and the Quicksilver 303, this is achieved with a smoothed, tri-stated, Pulse Width Modulation 5 volt signal via a 100k resistor to the base of Q10. All three systems exercise similar control over the Filter Frequency.

Reception of a **Control Change 123** (All Notes Off) turns off any note which is currently playing and resets Accent and Slide to Off. It does not alter the Filter Frequency drive.

Some other Control Changes can be used to alter the behaviour of the interface. See the Sequentix documentation.

## Default MIDI Transmission Behaviour

**Transmission of MIDI Sync** is on by default, as is transmission of Notes from the Internal sequencer. Reception of MIDI Sync will not normally cause the generation of MIDI Sync at MIDI Out, but this can be enabled (Sync Thru) with a SysEx message as explained in the Sequentix User Manual.

The velocity of a non-accented MIDI Out note is 63. The velocity of an accented MIDI Out note is 127.

MIDI Out Slide and Accent is driven by the TB-303's internal sequencer and is not affected by the CV inputs for these functions which are part of the Devil Fish.

If the internal sequencer plays notes with Slide, the new note's Note On message is sent before the old note's Note Off message. This means that slave devices which use this protocol will play the two notes with a single Gate pulse and with a slide to the new note's pitch. These devices include the Devil Fish MIDI In/Out system, TB-303s or Devil Fishes with this Sequentix interface or the Quicksilver 303; and the Cyclone Analogic TT-303 Bass Bot..

## Sync Lead

As with the Devil Fish MIDI In/Out system, the Sequentix MIDIBass 303 interface can use the Devil Fish Sync Lead: <http://www.firstpr.com.au/rwi/dfish/sync-lead/> .

This enables the Devil Fish to receive MIDI, including MIDI Sync, with the interface creating DIN Sync (Run/Stop and Clock) signals in response, driving the pins of the Sync socket, with the Sync Lead sending those DIN Sync signals to one, two or three other devices, such as other TB-303s, TR-606s or TR-808s.

## Update history

- 2013-05-13: Initial version.