REAL WORLD INTERFACES

Hardware and Software — Design and Consulting

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midi-808-rwi.pdf This is a copy of my documentation from July 1996 of the MIDI In system I made in the 1980s and I think the early 1990s. I don't currently have any PCBs for this modification, and there are a few other things I would need to do in order to make it again. This was never available as a kit – and at present I don't have any plans for making more of these.

Real World Interfaces MIDI Retrofit details for TR-808

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Features

- Velocity sensitive reception of notes to drive all drum circuits.

- Reception of sync to drive the TR-808 and to drive external devices via the Sync Socket.

- MIDI IN and THRU.

- Fast - 0.3 to 0.6 millisecond delay from end of MIDI message to start of sound.

- Fine reception of velocity so that all drum circuits can be driven very gently, triggered fully or anything in between.

Limitations

- No MIDI Out.

- Drum channel and note assignments fixed in the firmware - but I can change these to suit your needs.

Drum Triggering

One or more MIDI notes trigger each drum circuit. Each Tom and Conga sound (Low, Mid and High) is produced by a single drum circuit - so the three circuits respond to three MIDI notes or sets of notes. Likewise the Rimshot/Claves circuit is one circuit and responds to one or more MIDI notes - typically those which are usually used for Rimshot and Claves.

However the Hand Clap and Maracas circuits are independent. They share a common volume circuit and output, and are triggered by the same channel in the TR-808's internal sequencer. For the purposes of triggering from MIDI, they are separate drum circuits.

The Hand Clap circuit has been modified to give just a quiet "reverb" sound of noise at very low trigger levels. This does not affect its sound at higher levels, or when being driven from the TR-808's internal sequencer.

When a MIDI note with very low velocity is received, the interface is configured to trigger each drum circuit at the threshold of when it starts to sound. This gives the greatest range of expression, but it does mean that the exact velocity required to get a recognisable sound may vary slightly between drums, and might change a little with extremes of temperature.

Standard Note Number assignments on **Channel 10** - derived from General MIDI.
The interface software can be configured for another channel and for different note numbers if you require.
Some drum sounds respond to two MIDI notes - for instance the Snare responds to notes 38 and 40 which are both snares in General MIDI.

Note	Note Number	MT-32 sound = GMIDI?	Drum sound (Mirror of Drum Sound for GMIDI compatibility)	Comment
B 0	35	Acou BD		
C 1	36	Acou BD	BD - Kick	
C#1	37	Rim Shot	RS - Rimshot/ Claves	
D 1	38	Acou SD	SD - Snare	
D#1	39	Hand Clap	HD - HandClap	
E 1	40	Elec SD	(SD - Snare)	
F 1	41	Acou Low Tom	LT - Low Tom	
F#1	42	Clsd HiHat	CH - Closed HiHat	
G 1	43	Acou Low Tom	(LT - Low Tom)	
G#1	44	Open HiHat 2		
A 1	45	Acou Mid Tom	MT - Mid Tom	
A#1	46	Open HiHat 1	OH - Open HiHat	
B 1	47	Acou Mid Tom	(MT - Mid Tom)	
C 2	48	Acou Hi Tom	HT - Hi Tom	
C#2	49	Crash Cymbal	Cymbal	
D 2	50	Acou Hi Tom	(HT - Hi Tom)	
D#2	51	Ride Cymbal	(Cymbal)	
E 2	52		(Cymbal)	
F 2	53			
F#2	54	Tambourine		
G 2	55			
G#2	56	Cowbell	CB - Cowbell	
A 2	57			
A#2	58			
B 2	59			
C 3 Mid C	60	High Bongo		
C#3	61	Low Bongo		
D 3	62	Mt High Conga	(HT - High Tom)	Mt = Muted
D#3	63	High Conga	(MT - Mid Tom)	
E 3	64	Low Conga	(LT - Low Tom)	
F 3	65	High Timbale		
F#3	66	Low Timbale		
G 3	67	High Agogo		
G#3	68	Low Agogo		
A 3	69	Cabasa		
A#3	70	Maracas	MA - Maracas	
B 3	71	Smba Whis S		
C 4	72	Smba Whis L		
C#4	73	Qijada		
D 4	74			

D#4	75	Claves	RS - Rimshot/Claves	
E 4	76			

Note	Note Number	MT-32 sound = GMIDI?	Drum sound (Mirror of Drum Sound for GMIDI compatibility)	Comment
F 4	77			
F#4	78			
G 4	79			
G#4	80			
A 4	81			
A#4	82			
B 4	83			
C 5	84			
C#5	85			
D 5	86			
D#5	87			
E 5	88			
F 5	89			
F#5	90			
G 5	91			
G#5	92			
A 5	93			
A#5	94			
B 5	95			
C 6	96		AUX - Auxiliary Trigger Out	A 0 to 10V positive pulse from a separate socket. This is an arbitrary choice of drum number - to get it out of the way of other General MIDI assignments.

Auxiliary Trigger Out

A 6.5mm jack is the output for this signal, which is a narrow (0.6 msec) pulse with a sharp positive going leading edge and a decaying tail. The voltage of this pulse varies between 0 and +10 volts depending on the velocity. This is suitable for triggering synths - if the velocity is high enough to make the voltage 5 volts or so. It may be used for other applications, such as making click tracks. The output is via a 10K resistor, so it cannot drive anything hard enough to upset any input. You can plug it straight into an amplifier or effects unit, but it is a large signal and you should start with the input volume turned down very low.

TR-808 Trigger Outs

The TR-808 has three +15 Volt trigger outs, driven by the Accent, Hand Clap and Cowbell sequencer channels. These are not activated by the MIDI retrofit. They are ideal for clocking appeggiators in keyboards - by programming beats on the trigger's drum channel. If you want to use the Hand Clap trigger out, whilst you are triggering the Hand Clap and Maracas via MIDI, you can put the Hand Clap / Maracas switch in mid position, so the notes you program in the TR-808 (for the trigger outs) do not drive either of these drum circuits.

Roland Sync

Although Roland Sync has the same connector as MIDI, it is totally different. The middle pin is ground, and the two outside pins carry the two signals - Run/Stop and Clock. The intermediate pins are used for special purposes between the TR-808, TR-606, TB-303 and MC-202 (?) and MC-4 (?). On the TR-808 these intermediate pins are inputs only - Pin 4 is "Reset to start" and Pin 5 is "Fill in".

For normal sync purposes, the only signals that matter are Pin 1 "Run/Stop" and Pin 3 "Clock". These signals are either 0 or +5 volts - although it does not hurt them to drive up to 15 volts into them. Run/Stop rises at the start of the song and stays high until the end. Clock goes high and then low - a square wave - 24 times for each quarter note. This is the same rate as the MIDI Clock messages.

The TR-808 is typically a source of Roland Sync, but if you move the rear panel switch to "In" then it will depend on externally supplied Roland Sync. In this mode, its front panel Start/Stop switch and Tempo oscillator are not connected to anything.

Normally you will have the switch set to "Out" and the TR-808 will drive Run/Stop and Clock onto the socket on the rear panel. Devices which receive Roland Sync have high impedance inputs (very light loads) and anything - including the TR-808 - which drives Roland Sync is a low impedance source (solid drive). This means that one source can drive dozens of slave devices - all you need is to wire them up. The connections are all the same - pin 1, 2 and 3 of each plug goes to the same pins of all the other plugs. You do not need the intermediate pins - 4 and 5. So you can solder up a long sync lead with as many 5 pin DIN plugs as you like, with no need for shielding and length restrictions, and drive as many slaves as you like.

MIDI reception to drive Roland Sync

When the rear panel switch is set to "In", neither the front panel, nor the MIDI interface will drive the socket or the TR-808. This section assumes that the switch is set to "Out" and that the aim is to run the TR-808 (and any slave devices) either from its front panel or from MIDI.

The MIDI Interface can always drive the Run/Stop signal - which goes to the rest of the TR-808 and the slave devices. Likewise the front panel Start/Stop switch can also drive it as well. When either the front panel OR the MIDI interface has its Run/Stop active, then the TR-808 and slave devices will see that active Run/Stop.

The MIDI Interface can always drive the Clock signal - which goes to the rest of the TR-808 and the slave devices. When it does so, it disables the TR-808's front panel tempo oscillator.

Whenever the MIDI Interface receives a MIDI Clock message, it disables the tempo oscillator and drives the Clock signal with a 5 msec positive pulse. The tempo oscillator remains disabled for up to a second after the last clock pulse is received from MIDI. Sequencers and drum machines may put out MIDI Clock messages even while the song is not running.

Whenever a Start, Continue or Stop message is received from MIDI, the tempo oscillator is also disabled - with the one second delay before it is enabled again. So any of the four MIDI timing messages will temporarily disable the TR-808's front panel tempo oscillator. Note that the TR-808's front panel Run/Stop is not disabled - it can always drive the Run/Stop signal.

There is no way of disabling the MIDI Interface's Run/Stop, Clock and tempo oscillator disable functions. If for some reason you want to drive the TR-808 from some other source of sync, while the MIDI interface is receiving clock codes, then you will need to set the rear panel sync switch to "In" and drive the TR-808 from an external source of Roland Sync.

Using MIDI Sync

This section assumes that the rear panel sync switch is set to "Out". **If you want to drive the notes of the TR-808 from a MIDI sequencer, but do not want the TR-808 playing its own sequences, then before you start the MIDI sequencer, select a pattern on the TR-808 which has no notes programmed into it.** Probably the most convenient arrangement is to keep pattern 1 empty.

If the MIDI Interface is not receiving clock messages (or any other sync messages - Start, Continue or Stop) then you use the TR-808 as you normally would - starting it and controlling its speed from its front panel.

If the MIDI Interface is receiving clocks, but has not received a Start or Continue code, then it will disable the TR-808's tempo oscillator and provide the TR-808 and slave devices with clock pulses - one for each MIDI clock message. If the TR-808 is in pattern mode, then its LED will be flashing in time with the source of the MIDI clocks. If you press the Start/Stop button, the TR-808 and slave devices will start running according to the MIDI clock.

Normally, you would not use the Start/Stop button - you would want the TR-808 to start when the MIDI source tells it to. This will happen automatically. Either of the MIDI messages "Start" and "Continue" will raise the Run/Stop signal and set the TR-808 and slave devices running. The "Stop" command will drop the Run/Stop signal and put the TR-808 and slave devices back into their "waiting" mode.