

## The electronic drum and the MIDI or USB connection

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**Abstract:** *Along with the synthesizers (digital pianos) frequently used to create studio music, the electronic drum was another revolutionary instrument. Even though its purpose is to imitate an acoustic drum, there are significant differences. The electronic drum particulars are its small size; the metallic frame which supports the stands to which the elements of the drum are attached; the material these are made of – silicon or rubber – which renders the sound extremely silent. The genuine sound of the instrument can only be rendered by adequate monitoring (headphones or monitors) and it requires a MIDI or USB connection to its module<sup>2</sup>.*

Keywords: *electronic drum, connexion, digital, MIDI, USB*

### 1. The digital dimension of the acoustic drum

It was the synthesizers which preceded the electronic drum in the 70s. As a matter of fact the digital keyboard was the first to allow an imitation of the acoustic drum sound among others.

In 1971, the acoustic drum was given a digital dimension by Graeme Edge<sup>3</sup> who teamed with Brian Groves, a professor at the Sussex University. It actually meant an incipient form of what would later be the triggers (Dean 2012, 367).

In 1973, this concept emerged in the shape of a new instrument the Moog 1130 Percussion Controller, which also served as a digital piano. The basic principle was homophony and the sounds could alternate by means of the pushbuttons displayed on the sides of the instrument, or by switching the cables attached at its back. The sounds of the electronic drum were added to a device connected to this synthesizer (Figure 1).

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<sup>2</sup> It is only this very module of the drum that can be connected (via USB) to a computer or to an external soundboard

<sup>3</sup> Drummer with the Moody Blues band; the electronic drum was used for the track *Procession*, on the album *Every Good Boy Deserves a Favour* (1971)



Fig. 1. *The device connected to the synthesizer*

The first electronic drum included a single actual drum element (Fig.2). It was built in 1976 by Pollard Industries and called the Syndrum (Tindale 2009, 18); its concept was later purchased by Research Development Inc. who made various models derivative of the original. It is important to note that these varieties of the Syndrum employed a different number of electronic pads<sup>4</sup>.



Fig. 2. *Syndrum*

In 1977, Star Instruments introduced the electronic drum Synare whose built foreshadowed the electronic drums module. It was basically a synthesizer although not controlled by means of a keyboard but operated by tapping the pads.

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<sup>4</sup> Electronic drum membranes with aspect and sound similar to those of the acoustic drum

The first acoustic drums company which realized the potential of the electronic sound and decided to become actively involved in its development was Pearl. In 1979 the market was presented with the electronic drum SY Syncussion that employed two oscillators, each carrying its own sound. These were attached to the acoustic drum and so formed an extension of the sonic spectre; for the first time the performer had the two types of sound merge together: the acoustic and the electronic. The idea was adopted by other companies too, but there was nothing close to the present concept yet, of the autonomous instrument as we know it today. The English company Premier made a first move in this direction by presenting the SDS-3, in 1980.

In 1985, the idea of sensitive pads connected to a module firstly emerged. This device was called the brain of the instrument since it enabled all necessary alterations, including switching the tones. This new electronic drum was named Octopad (Figure 3) and it was a creation of Roland.



Fig. 3. *Octopad*

One must note that there were other companies too, to become involved in research in the field: Dynacord, Maxim, Liss, Yamaha, Gretsch, Sonor, Tama or Fishman, most of which eventually focused on developing acoustic instruments.

In 1978, Ddrum-2 promoted a new type of electronic pads, known as Real Drumheads distinguished by the employment of a wide dynamic palette and by resembling the acoustic drum since it was operated by hitting. The fact that the sound is differentiated depending on the place the pad is hit (centre or margin) is of major importance.

In 1992, the AT-System promoted an electronic drum module replacing pads with *triggers* – a really successful innovation still valid today. These were placed on the frame of each element of the drum kit and were meant to absorb the vibration from the beat membrane and to convert it into electronic sound.

Alesis promotes a new type of *triggers*, D4, with a new range of sounds such as those of the classical orchestra and those of the traditional ethnic percussion. Furthermore the palette of electronic sounds is considerably wider.

At the same time, Roland comes up with the TD-7 electronic drum whose central feature is to emulate acoustic sounds. The pads were operated in two areas covered in black; it had a big drum and a pad hit by the pedal typical for the acoustic drum.

It was also the time when another giant of the industry – Yamaha, made its presence felt. The Japanese company was already well-known for the quality of the acoustic instruments it produced and the digital approach favourably impacted the development of the branch. Along with pianos and other digital instruments they ventured into making electronic drums.

The first of this kind was DTX 1.0 and its purpose was to offer the player the opportunity to practice privately, at home. Thus the brand attached the module a set of melodies as a support for individual practice. The impact was major and it resulted in the creation of the DTX 2.0, in 1996 (Figure 4). It would greatly impress due to its 1000 semi-flat sounds and its 64 drum pre-sets. Along with these new sounds it also had an inbuilt *Groove check* function whose purpose was to train the player in the rhythmic, pulsation aspect.



Fig. 4. DTX 1.0

Today the Yamaha electronic drums are extremely close to the acoustic ones as to the sounds and the pad recoil. There were significant improvements (Garcia 2014, 19) with models DTX 402, DTX 502, DTX 700 and DTX 900 (Figure 5). These incorporate sound sets taken from the Yamaha acoustic drums, as well as the real sounds of several percussions and the acoustics quality is superior. Moreover the

module of these series integrate 50 melodies with or without rhythm, as well as a unique system of practice that enables switching the difficulty level. The elements are supported by a metal frame and ordered exactly following the acoustic model.



Fig. 5. *DTX 900*

One of the most important changes brought to models starting with DTX 582 is the natural way of response of the instrument surfaces. Such change enables the player to switch more easily from the acoustic to the electronic drum and vice versa.

It should also be mentioned that work was carried on during the same time, on the development electronic percussion which was based on the same principle of sampling the acoustic percussion instruments, as it was done with the drums. These instruments are known as DTX Multi Pad 12 (Yamaha), Sampling Pad (Roland) or electronic percussion. Today all these instruments can be connected to a computer due to development, over time, of the MIDI connection or to the most recent innovation in the matter, the USB connection.

## 2. The MIDI or USB connection

The MIDI (Terry 2011, 26) connection (Musical Instruments Digital Interface) came about in 1982. It enables all electronic musical instruments to directly communicate with the computer. The MIDI does not transmit audio signals only pitches or velocities. It has to be said that for a good connection, this has to go

from the electronic instrument through a soundboard (integrated or not) and then directly into the computer (Figure 6).

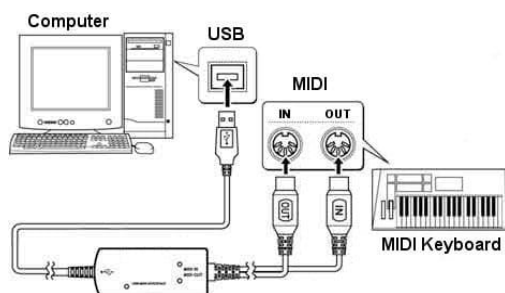


Fig. 6. *The MIDI connection*

The MIDI interface (soundboard) uses optical insulation connexions to avoid the grounding alternative (of the MIDI device). The connexion is realized through the entry and exit lines, so the received MIDI messages will occur in the exit line (MIDI OUT). To avoid possible delays of the rendered sound, the MIDI-THRU was added which considerably improves the quality of the connexion.

All instruments compatible with MIDI have the port of the same name already installed. There are some computer soundboards which already have a MIDI interface incorporated while others need an external interface to be connected to the computer via USB, Fire-Wire or Ethernet. After the year 2000, computers that have a USB have increased in numbers, as a result companies have started to devise an extension between the MIDI and the USB connexions. Along with that, computers have been more and more often utilized in composing music, so companies produce MIDI controllers provided with USB. All these changes have led to the development of musical softs.

The MIDI and USB connexions also function to connect with music programmes known as *Software*. (Fig. 7) These include numerous best quality sound libraries. With the instrument connected to these specific studio programmes, real time recording is possible, using such sounds.

To better facilitate microphone recording of acoustic drums, specialists resorted to developing these connexions, which for the first time enabled quantifying the rhythmic score. This technique (exclusively via the MIDI recording connexion) brought about the metronome setting of all sounds.



Fig. 7. Software

This move led to the development and commercializing of *Drum Loops*, which were repeated loops. Adapting to this was rapid, all instruments subsequently adopted this loop technique. Its success was owed to the fact that the recording of real instruments and their sampling was carried out in the best studios so each and every intensity level could be retrieved. The greatest computer programmes which include drum sounds are Toontrack and Superior Drummer. These include numerous sounds of acoustic drum kits and even pre-set MIDI recordings called *Drum Patterns*.

### 3. Conclusion

The electronic drum and percussion have been welcomed by players ever since the technology came on the scene. Many of these were interested in trying out its possibilities, others used it for physical reasons (special cases) while some employed it to meet the requirements of the time and those of the ever evolving musical market. Players made use of it in studio recordings (session drummers such as Allan Schwartzberg, Jeff Porcaro, Omar Hakim, and others).

The electronic kit has been employed over the years either as an extension of the acoustic drum or as a distinct synthesizing alternative.

In conclusion, the electronic drum is an alternative to and not a replacement for the acoustic kit; both carry the same high value for studio recordings as well as for live performers.

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