Introduction DX7!

Imagine, 1983 synthesizers: polyphony was limited to about six or eight voices, keys were not velocity sensitive, no scaling of envelope times and output level of the oscillators on the basis of key numbers. No separate pitch envelope for each voice, let alone connection of a breath controller, two swell pedals and two foot switches. However, the DX7 did have all of the above.

For the first time in years, *a truly expressive electronic musical instrument* that made a link to the feeling you also have with acoustic instruments. Pianists, who previously had no interest in synthesizers, changed their mind and bought a DX7. All those luxurious real-time controlling possibilities coupled with an extremely powerful sound generation: a combination of FM and additive synthesis.

The latter is often wrongly forgotten. Precisely this additive algorithm 32 is great! Tone wheel organ sounds you could build with it or demonstrate the strike tone of a bell, the missing fundamental. In combination with the very luxurious output level scaling of the oscillators, you could for the first time easily imitate the psychoacoustic phenomena by Shepard and Risset but now at home while having coffee. These were the so-called barber pole effects, rising tones that nevertheless did not rise on balance. And the paradoxical scale. Risset had designed such a scale: you played do-re-mi-fa-sol etc. until the next octave. That turned out to be not an octave at all. No, strangely enough you ended a half-tone lower than you had started with. Yes, from now on you could do these experiments just at home instead of in a not so accessible university studio.

Precisely those 32 so-called oscillator configurations (algorithms in Yamaha jargon) made the DX7 into a DX7. The original FM synthesis model of Chowning was based on only two sinus oscillators at first. Extended by Yamaha to six and supplemented with a feedback circuit for one oscillator. That feedback loop: feedback of the oscillator output to the FM input made it possible to generate more analogue sounding sounds. With a large FM modulation depth you quickly get an erratic energy distribution in the overtones, which sounds very characteristically FM. With that feedback option you could compensate for that quite well. Once you became more skilled in FM programming, it was a kick to build sounds that didn't sound like they had been realised with FM synthesis.

In short, a great instrument that DX7. It meant the democratization of sound synthesis; that was now within the reach of many. All the more because the instrument was an example of a synthesizer with the emphasis on content. No bells and whistles as a camouflage for shortcomings. The DX7 also ensured that a new industry arose: sound design, the programming of sounds by separate companies.

With this synth where it was purely about content, you could go all the way. Precisely because you could deal with sound on such a fundamental level, it was an ideal educational tool. Whole classes of conservatory students have thus become acquainted with the essence of musical sound. Several generations of carillonneurs could now use the DX7 to discover the essential characteristics of the bell sound.

The DX7 was also a good example of the beginning of globalisation in the industry: The American happy accident: John Chownings discovery of FM as a sound-forming principle. Awesomely cast in solidified form in Japan, equipped with software that largely came from Europe: many original DX7 sounds were made by David Bristow, an English psychologist, but above all a talented musician. This globalisation in the development and production is now indispensable.

Was there nothing to complain about that DX7? Certainly: there was still a lot of digital clutter

coming from those 12 bit(s) DACs. 32 memories for sound parameters, but only one memory slot allocated for all that luxury real time controlling, the so-called function memory. Too bad, also no alternative tuning possibilities on board. Well, that was all put right with the DX7 II: 16 bits and all the other inconveniences resolved. And on top of that, the Mk II made it possible to stack two sounds.

Thank you Mr Chowning
Domo arigato gozaimashta Ishimura-san

internet links
Dexed, free DX7 clone for OSX and Windows
https://asb2m10.github.io/dexed/

Interviews with John Chowning
https://www.youtube.com/watch?v=i1uzjFDQM3c
https://www.youtube.com/watch?v=fScdhVk9kJc
https://www.youtube.com/watch?v=Hloic1oBfug