

Quad SN76489 Synthesizer Features

The SN76489 is a 16 pin DIP programmable sound generator TTL chip that was developed in the late 1970s to be used in the Texas Instruments TI-99/4 Computer System. It later found its way into the Sega Master System, Sega Game Gear, and Sega Genesis, as well as the IBM PC Jr. It features 3 square wave channels and one noise channel with 10 bit frequency precision and 4 bits controlling attenuation. It works by presetting counters to a value inversely related to the desired frequency, and when the counters reach zero, the output changes state.

- MIDI Plug and Play USB Device
- Intelligent “Last Note” Pull Off: (Keeps track of the order notes are held down and always defaults to the most recently played note.)
- Glide/Portamento Legato: When a note is played while another note is held down, the pitch will glide to the new note. (Pitch will also glide linearly with respect to musical notes, not frequency.) With adjustable glide speed.
- Pitch Bend, mapped linearly with respect to musical notes, not frequency. Adjustable pitch bend range, from +/-1 semitone to +/-12 semitones (1 octave).
- Arpeggiator with adjustable speed. Ability to switch arpeggiator on and off while playing without affecting the intelligent pull off.
- Vibrato on monophonic modes.
- Adjustable decay (from continuous sustain to almost inaudible blips) using 4 bit onboard attenuation controls.
- Ability to play 4 bit 4ks/s drum samples from embedded PCM data, (audio data is actually 8 bit, but the chip only has 16 levels of volume) with adjustable sample playback rate and sample rate decimation.
- Polyphonic mode, utilizing 6 channels between chips #2 and #3. Velocity sensitive, which can be toggled on or off globally. Polyphonic mode also replaces oldest notes with newer notes when polyphony limit is reached.
- Two monophonic channels on chip #4.
- Tremolo feature available on polyphonic mode.
- “Bass Mode” trick, where pulse channel 3 on a chip controls the pitch of one of the polynomials coming out of the linear feedback shift register to create fundamentals much lower than the pulse channels are capable of, with harmonics appropriate for bass parts.
- Noise mode, where the 7 combinations of shift rates and polynomials are accessible.
- Onboard LED shows MIDI commands received (excluding note-off commands).

Quad SN76489 Synthesizer Channel / CC Guide

CH	1	2	3	4	5	6
	Drum Samples (Chip 1) Ch1-4	Polyphonic Mode (Chip 2 & 3) Ch 1-4 On Each	Bass Mode (Chip 4) Ch 3-4	Noise Mode (Chip 3) Ch 3-4	Legato Mode (Chip 4) Ch 1	Legato Mode (Chip 4) Ch 2
CC#						
1	Sample Rate Normal → Slower	Tremolo	Vibrato	N/A	Vibrato	Vibrato
2	Global Bend Range					
3	N/A	Decay	Decay	N/A	Decay	Decay
4	N/A	N/A	Arpeggiator On/Off	N/A	Arpeggiator On/Off	Arpeggiator On/Off
5	N/A	N/A	Arpeggiator Speed	N/A	Arpeggiator Speed	Arpeggiator Speed
20	N/A	N/A	Portamento Speed	N/A	Portamento Speed	Portamento Speed
Pitch Bend	Sample Decimation	N/A	Pitch Bend	N/A	Pitch Bend	Pitch Bend