Drum kits were first developed due to financial and space considerations in theatres where drummers were encouraged to cover as many percussion parts as possible. Up until then, drums and cymbals were played separately by individual percussionists. Initially, drummers played the bass and snare drums by hand, and then in the 1890s they started experimenting with foot pedals to play the bass drum. Very early on, some percussionists played a bass drum with a foot giving it the name 'kick drum'. William Ludwig made the first bass drum pedal in 1909, paving the way for the modern drum kit.

In the 1920s, drum kits were characterized by very large marching bass drums and many percussion items suspended on and around it, and they became a central part of jazz music. Hi-hat stands appeared around 1926. Metal consoles were developed to hold Chinese tom-toms, with swing out stands for snare drums and cymbals. On top of the console was a "contraption" (shortened to "trap") tray used to hold whistles, klaxons, and cowbells, thus drum kits were dubbed "trap kits."

By the 1930s, Ben Duncan and others popularized streamlined trap kits leading to a basic four piece drum set standard: bass, snare, tom-tom, and floor tom. In time legs were fitted to larger floor toms, and "consolettes" were devised to hold smaller tom-toms on the bass drum. In the 1940s, Louie Bellson pioneered use of two bass drums, or the double bass drum kit. Gene Krupa was the first drummer to head his own orchestra and thrust the drums into the spotlight with his drum solos; others would soon follow his lead. With the ascendancy of rock and roll, a watershed moment occurred between 1962 and 1964, when the Surfaris released "Wipe Out" and when Ringo Starr of The Beatles played his Ludwig kit on American television; events that motivated legions to take up the drums.

The trend toward bigger drum kits in Rock music began in the 1960s and gained momentum in the 1970s. By the 1980s, widely popular drummers like Billy Cobham, Carl Palmer, Nicko McBrain, Phil Collins, Stewart Copeland and perhaps most notably Neil Peart were using large numbers of drums and cymbals and had also begun using electronic drums. In the 1990s and 2000s, many drummers in popular music and indie music have reverted back to basic four piece drum set standard.

In the 2000s, it is not uncommon for drummers to use a variety of auxiliary percussion instruments, found objects, and electronics as part of their "drum" kits. Popular electronics include: electronic sound modules; laptop computers used to activate loops, sequences and samples; metronomes and tempo meters; recording devices; and personal sound reinforcement equipment (e.g., a small PA system to amplify electronic drums and provide a monitor for singing).