= Hammond organ =

The Hammond organ is an electric organ , invented by Laurens Hammond and John M. Hanert and first manufactured in 1935 . Various models have been produced , most of which use sliding drawbars to create a variety of sounds . Until 1975 , Hammond organs generated sound by creating an electric current from rotating a metal tonewheel near an electromagnetic pickup , and then strengthening the signal with an amplifier so that it can drive a speaker cabinet . Around two million Hammond organs have been manufactured , and it has been described as one of the most successful organs . The organ is commonly used with , and associated with , the Leslie speaker .

The organ was originally marketed and sold by the Hammond Organ Company to churches as a lower @-@ cost alternative to the wind @-@ driven pipe organ , or instead of a piano . It quickly became popular with professional jazz musicians in organ trios , a small group centred on the Hammond organ . Organ trios were hired by jazz club owners , who found that organ trios were a much cheaper alternative to hiring a big band . Jimmy Smith 's use of the Hammond B @-@ 3 , with its additional harmonic percussion feature , inspired a generation of organ players , and its use became more widespread in the 1960s and 1970s in rhythm and blues , rock and reggae , as well as being an important instrument in progressive rock .

The Hammond Organ Company struggled financially during the 1970s as they abandoned tonewheel organs and switched to manufacturing instruments using integrated circuits . These instruments were not as popular with musicians as the tonewheels had been , and the company went out of business in 1985 . The Hammond name was purchased by the Suzuki Musical Instrument Corporation , which proceeded to manufacture digital simulations of the most popular tonewheel organs . This culminated in the production of the " New B @-@ 3 " in 2002 , which provided an accurate recreation of the original B @-@ 3 organ using modern digital technology .

Hammond @-@ Suzuki continues to manufacture a variety of organs for both professional players and churches . Other companies , such as Korg , Roland and Clavia , have also achieved success in providing emulations of the original tonewheel organs . The sound of a tonewheel Hammond can also be emulated using modern software such as Native Instruments B4 .

= = Features = =

A number of distinctive Hammond organ features are not usually found on other keyboards like the piano or synthesizer . Some are similar to a pipe organ , but others are unique to the instrument .

= = = Keyboards and pedalboard = = =

Most Hammond organs have two 61 @-@ note ( 5 @-@ octave ) manuals . Each manual is laid out in a similar manner to a piano keyboard , except pressing a key results in the sound continuously playing until it is released . There is no difference in volume regardless of how heavily the key is pressed , so overall volume is controlled by a pedal ( also known as a " swell " or " expression " pedal ) . The keys on each manual have a lightweight action , which allows players to perform rapid passages more easily than on a piano . In contrast to piano and pipe organ keys , Hammond keys have a flat @-@ front profile , commonly referred to as " waterfall " style . Early Hammond console models had sharp edges , but starting with the B @-@ 2 these were rounded , as they were cheaper to manufacture . The M series of spinets also had waterfall keys ( which has subsequently made them ideal for spares on B @-@ 3s and C @-@ 3s ) , but later models had " diving board " style keys which resembled those found on a church organ . Modern Hammond @-@ Suzuki models use waterfall keys .

Hammond console organs come with a wooden pedalboard played with the feet , for bass notes . Most Hammond pedalboards have 25 notes , with the top note a middle C , because Hammond found that on traditional 32 @-@ note pedalboards used in churches , the top seven notes were seldom used . The Hammond Concert models E , RT , RT @-@ 2 , RT @-@ 3 and D @-@ 100 had 32 @-@ note American Guild of Organists ( AGO ) pedalboards going up to the G above middle C

as the top note . The RT @-@ 2 , RT @-@ 3 and D @-@ 100 also contained a separate solo pedal system that had its own volume control and various other features . Spinet models had 12- or 13 @-@ note miniature pedalboards with stamped steel pedals .

= = = Drawbars = = =

The sound on a tonewheel Hammond organ is varied through the manipulation of drawbars . A drawbar is a metal slider that controls the volume of a particular sound component , in a similar way to a fader on an audio mixing board . As a drawbar is incrementally pulled out , it increases the volume of its sound . When pushed all the way in , the volume is decreased to zero .

The labeling of the drawbar derives from the stop system in pipe organs , in which the physical length of the pipe corresponds to the pitch produced . Most Hammonds contain nine drawbars per manual . The drawbar marked " 8 ' " generates the fundamental of the note being played , the drawbar marked " 16 ' " is an octave below , and the drawbars marked " 4 ' " , " 2 ' " and " 1 ' " are one , two and three octaves above respectively . The other drawbars generate various other harmonics and subharmonics of the note . While each individual drawbar generates a relatively pure sound similar to a flute or electronic oscillator , more complex sounds can be created by mixing the drawbars in varying amounts . Some spinet models do not include the two subharmonic drawbars on the lower manual .

Some drawbar settings have become well known and associated with certain musicians . A very popular setting is 888000000 ( i.e. , with the drawbars labelled " 16 ' " , " 51 / 3 ' " and " 8 ' " fully pulled out ) , and has been identified as the " classic " Jimmy Smith sound .

= = = Presets = = =

In addition to drawbars , many Hammond tonewheel organ models also include presets , which make predefined drawbar combinations available at the press of a button . Console organs have one octave of reverse colored keys ( naturals are black , sharps and flats are white ) to the left of each manual , with each key activating a preset ; the far left key ( C ) , also known as the cancel key , de @-@ activates all presets , and results in no sound coming from that manual . The two right @-@ most preset keys ( B and B ? ) activate the corresponding set of drawbars for that manual , while the other preset keys produce preselected drawbar settings that are internally wired into the preset panel . Presets can be changed by rerouting the associated color @-@ coded wires on the rear of the organ . Some spinet models have flip tabs for presets situated above the manuals .

= = = Vibrato and chorus = = =

Hammond organs have a built @-@ in vibrato effect that provides a small variation in pitch while a note is being played , and a chorus effect where a note 's sound is combined with another sound at a slightly different and varying pitch . The best known vibrato and chorus system consists of six settings , V1 , V2 , V3 , C1 , C2 and C3 ( i.e. , 3 vibrato and 3 chorus ) , which can be selected via a rotary switch . Vibrato / chorus can be selected for each manual independently .

= = = Harmonic Percussion = = =

The B @-@ 3 and C @-@ 3 models introduced the concept of " Harmonic Percussion " , which was designed to emulate the percussive sounds of the harp , xylophone and marimba . When selected , this feature plays a decaying second- or third @-@ harmonic overtone when a key is pressed . The selected percussion harmonic fades out , leaving the sustained tones the player selected with the drawbars . The volume of this percussive effect is selectable as either Normal or Soft . Harmonic Percussion retriggers only after all notes have been released , so legato passages sound the effect only on the very first note or chord , making Harmonic Percussion uniquely a " single @-@ trigger , polyphonic " effect

= = = Leslie speaker controls = = =

Hammond organs may have a console or pedal switch for controlling the rotation speed of a Leslie rotating speaker cabinet that is connected to the organ . The switch allows the player to toggle between fast ( tremolo ) and slow ( chorale ) rotation . The most distinctive effect occurs as the speaker rotation speed changes . The tasteful application of the different Leslie speed sound effects to Hammond organ playing is a distinctive part of the characteristic Hammond sound .

= = = Start and Run switches = = =

Before a Hammond organ can produce sound , the motor that drives the tonewheels must come up to speed . On most models , starting a Hammond organ involves two switches . The " Start " switch turns a dedicated starter motor , which must run for about 12 seconds . Then , the " Run " switch is turned on for about four seconds . The " Start " switch is then released , whereupon the organ is ready to generate sound . The H @-@ 100 and E @-@ series consoles and L @-@ 100 and T @-@ 100 spinet organs , however , had a self @-@ starting motor that required only a single " On " switch .

It is possible to create a pitch bend on the Hammond organ by turning the " Run " switch off and on again . This briefly cuts power to the generators , causing them to run at a slower pace and generate a lower pitch for a short time . Hammond 's New B3 contains similar switches to emulate this effect , though it is a digital instrument .

= = History = =

= = = Background = = =

The Hammond organ 's technology derives from the Telharmonium , an instrument created in 1897 by Thaddeus Cahill . The telharmonium used revolving electric alternators which generated tones that could be transmitted over wires . The instrument was bulky , because the alternators had to be large enough to generate high voltage for a loud enough signal . The Hammond organ solved this problem by using an amplifier .

Laurens Hammond graduated from Cornell University with a mechanical engineering degree in 1916 . By the start of the 1920s he had designed a spring @-@ driven clock , which provided enough sales for him to start his own business , the Hammond Clock Company , in 1928 . As well as clocks , his early inventions included 3D glasses and an automatic bridge table shuffler . However , as the Great Depression continued into the 1930s , sales of the bridge table declined and he decided to look elsewhere for a commercially successful product . Hammond was inspired to create the tonewheel or " phonic wheel " by listening to the moving gears of his electric clocks and the tones produced by them . He gathered pieces from a second @-@ hand piano he had purchased for $ 15 and combined it with a tonewheel generator in a similar form to the telharmonium , albeit much shorter and more compact . Since Hammond was not a musician , he asked the company 's assistant treasurer , W. L. Lahey , to help him achieve the desired organ sound . To cut costs , Hammond made a pedalboard with only 25 notes , instead of the standard 32 on church organs , and it quickly became a de facto standard .

On April 24 , 1934 , Hammond filed U.S. Patent 1 @,@ 956 @,@ 350 for an " electrical musical instrument " , which was personally delivered to the patent office by Hanert , explaining that they could start production immediately and it would be good for local employment in Chicago . The invention was unveiled to the public in April 1935 and the first model , the Model A , was made available in June of that year . Over 1 @,@ 750 churches purchased a Hammond organ in the first three years of manufacturing , and by the end of the 1930s over 200 instruments were being made each month . For all its subsequent success with professional musicians , the original company did

not target its products at that market , principally because Hammond did not think there was enough money in it . It has been estimated that the Hammond Organ Company produced about two million instruments in its lifetime ; these have been described as " probably the most successful electronic organs ever made " . In 1966 , it was estimated that about 50 @,@ 000 churches had installed a Hammond .

In 1936 , the Federal Trade Commission ( FTC ) filed a complaint claiming that the Hammond Company made " false and misleading " claims in advertisements for its organ , including that the Hammond could produce " the entire range of tone coloring of a pipe organ " . The complaint resulted in lengthy hearing proceedings , which featured a series of auditory tests that pitted a Hammond costing about $ 2600 against a $ 75 @,@ 000 Skinner pipe organ in the University of Chicago Rockefeller Chapel . During the auditory tests , sustained tones and excerpts from musical works were played on the electric and pipe organs while a group of musicians and laymen attempted to distinguish between the instruments . While attorneys for Hammond argued that the test listeners were wrong or guessed nearly half the time , witnesses for the FTC claimed that Hammond employees had unfairly manipulated the Skinner organ to sound more like the Hammond . In 1938 , the FTC ordered Hammond to " cease and desist " a number of advertising claims , including that its instrument was equivalent to a $ 10 @,@ 000 pipe organ . After the FTC 's decision , Hammond claimed that the hearings had vindicated his company 's assertions that the organ produced " real " , " fine " , and " beautiful " music , phrases which were each cited in the FTC 's original complaint but not included in the " cease and desist " order . Hammond also claimed that although the hearing was expensive for his company , the proceedings generated so much publicity that " as a result we sold enough extra organs to cover the expense . "

A key ingredient to the Hammond organ 's success was the use of dealerships and a sense of community . Several dedicated organ dealers set up business in the United States and there was a bi @-@ monthly newsletter , The Hammond Times , mailed out to subscribers . Advertisements tended to show families centered around the instrument , often with a child playing it , as an attempt to show the organ as a center @-@ point of home life and to encourage children to learn music .

= = = Tonewheel organs = = =

Hammond organs , as manufactured by the original company , can be divided into two main groups :

Console organs have two 61 @-@ note manuals and a pedalboard of at least two octaves . Most consoles do not have a built @-@ in power amplifier or speakers , so an external amplifier and speaker cabinet is required .

Spinet organs have two 44 @-@ note manuals and one octave of pedals , plus an internal power amplifier and set of speakers .

= = = = Console organs = = = =

The first model in production , in June 1935 , was the Model A. It contained most of the features that came to be standard on all console Hammonds , including two 61 @-@ key manuals , a 25 @-@ key pedalboard , an expression pedal , 12 reverse @-@ color preset keys , two sets of drawbars for each manual , and one for the pedals .

To address concerns that the sound of the Hammond was not rich enough to accurately mimic a pipe organ , the model BC was introduced in December 1936 . It included a chorus generator , in which a second tonewheel system added slightly sharp or flat tones to the overall sound of each note . The cabinet was made deeper to accommodate this . Production of the old Model A cases stopped , but the older model continued to be available as the AB until October 1938 .

Criticism that the Hammond organ was more aesthetically suitable to the home instead of the church led to the introduction of the model C in September 1939 . It contained the same internals as the AB or BC , but covered on the front and sides by " modesty panels " to allow for modesty while playing in a skirt , often a consideration when a church organ was placed in front of the congregation

. The model C did not contain the chorus generator , but had space in the cabinet for it to be fitted . The concurrent model D was a model C with a pre @-@ fitted chorus . Development of the vibrato system took place during the early 1940s , and was put into production shortly after the end of World War II . The various models available were the BV and CV ( vibrato only ) and BCV and DV ( vibrato and chorus ) .

The B @-@ 2 and C @-@ 2 , introduced in 1949 , allowed vibrato to be enabled or disabled on each manual separately . In 1954 , the B @-@ 3 and C @-@ 3 models were introduced with the additional harmonic percussion feature . Despite several attempts by Hammond to replace them , these two models remained popular and stayed in continuous production through early 1975 .

To cater more specifically to the church market , Hammond introduced the Concert Model E in July 1937 , which included a full 32 @-@ note pedalboard and four electric switches known as toe pistons , allowing various sounds to be selected by the feet . The model E was replaced by the model RT in 1949 , which retained the full size pedalboard , but otherwise was internally identical to the B and C models . RT @-@ 2 and RT @-@ 3 models subsequently appeared in line with the B @-@ 2 / C @-@ 2 and B @-@ 3 / C @-@ 3 respectively .

In 1959 , Hammond introduced the A @-@ 100 series . It was effectively a self @-@ contained version of the B @-@ 3 / C @-@ 3 , with an internal power amplifier and speakers . The organ was manufactured in a variety of different chassis , with the last two digits of the specific model number determining the style and finish of the instrument . For example , A @-@ 105 was " Tudor styling in light oak or walnut , " while the A @-@ 143 was " warm cherry finish , Early American styling " . This model numbering scheme was used for several other series of console and spinet organs that subsequently appeared . The D @-@ 100 series , which provided a self @-@ contained version of the RT @-@ 3 , followed in 1963 .

The E @-@ 100 series was a cost @-@ reduced version of the A @-@ 100 introduced in 1965 , with only one set of drawbars per manual , a reduced number of presets , and a slightly different tone generator . This was followed by the H @-@ 100 series , with a redesigned tonewheel generator and various other additional features . Unfortunately , the organ was not particularly well made , and suffered a reputation for being unreliable . Hammond service engineer Harvey Olsen said " When they [ H @-@ 100s ] work , they sound pretty decent . But die @-@ hard enthusiasts won 't touch it . "

= = = = Spinet organs = = = =

Though the instrument had been originally designed for use in a church , Hammond realized that the amateur home market was a far more lucrative business , and started manufacturing spinet organs in the late 1940s . Outside of the United States , they were manufactured in greater numbers than the consoles , and hence were more widely used . Several different types of M series instruments were produced between 1948 and 1964 ; they contained two 44 @-@ note manuals with one set of drawbars each , and a 12 @-@ note pedalboard . The M model was produced from 1948 to 1951 , the M @-@ 2 from 1951 to 1955 , and the M @-@ 3 from 1955 to 1964 . The M series was replaced by the M @-@ 100 series in 1961 , which used a numbering system to identify the body style and finish as used on earlier console series . It included the same manuals as the M , but increased the pedalboard size to 13 notes , stretching a full octave , and included a number of presets .

The L @-@ 100 series entered production at the same time as the M @-@ 100 . It was an economy version , with various cost cutting changes so the organ could retail for under $ 1000 . The vibrato was a simpler circuit than on other consoles and spinets . Two variations of the vibrato were provided , plus a chorus that mixed various vibrato signals together . The expression pedal , based on a cheaper design , was not as sophisticated as on the other organs . The L @-@ 100 was particularly popular in the UK and sold well , with several notable British musicians using it instead of a B @-@ 3 or C @-@ 3 .

The T series , produced from 1968 to 1975 , was the last of the tonewheel spinet organs . Unlike all the earlier Hammond organs , which used vacuum tubes for pre @-@ amplification , amplification ,

Percussion and Chorus @-@ Vibrato control , the T series used all @-@ solid @-@ state , transistor circuitry , though , unlike the L @-@ 100 , it did include the scanner @-@ vibrato as seen on the B @-@ 3 . Other than the T @-@ 100 series models , all other T @-@ Series models included a built @-@ in rotating Leslie speaker and some included an analog drum machine , while the T @-@ 500 also included a built @-@ in cassette recorder . It was one of the last tonewheel Hammonds produced .

= = = Transistor organs = = =

In the 1960s , Hammond started making transistor organs . The first organ that bridged the gap between tonewheel and transistor was the X @-@ 66 , introduced in May 1967 . The X @-@ 66 contained just 12 tonewheels , and used electronics for frequency division . It contained separate " vibrato bass " and " vibrato treble " in an attempt to simulate a Leslie speaker . Hammond designed it as the company 's flagship product , in response to market competition and to replace the B @-@ 3 . However , it was considered expensive at $ 9 @,@ 795 and it sold poorly . It did not sound like a B @-@ 3 .

Hammond introduced their first integrated circuit ( IC ) model , the Concorde , in 1971 . The company had stopped manufacturing tonewheel organs entirely by 1975 , due to increased financial inefficiency , and switched to making IC models full @-@ time . Console models included the 8000 Aurora ( 1976 ) and 8000M Aurora ( 1977 ) , which contained drawbars and a built @-@ in rotating speaker . Spinet organs included the Romance series , manufactured between 1977 and 1983 . In 1979 , a Japanese offshoot , Nihon Hammond , introduced the X @-@ 5 , a portable solid @-@ state clone of the B @-@ 3 .

= = = Hammond @-@ Suzuki = = =

Laurens Hammond died in 1973 , and the company struggled to survive , proposing an acquiring of Roland in 1972 , which was turned down . Roland 's Ikutaro Kakehashi did not believe it was practical at that point to move the entire manufacturing operation from Chicago to Japan , and also viewed Hammond 's declining sales figures as a problem . Hammond went out of business in 1985 , though servicing and spares continued to be available after this under the name of The Organ Service Company . In early 1986 , the Hammond brand and rights were acquired by Hammond Organ Australia , run by Noel Crabbe .

The name was purchased by the Suzuki Musical Instrument Corporation in 1989 , who rebranded the company as Hammond @-@ Suzuki . Although nominally a Japanese company , founder Manji Suzuki was a fan of the instrument and retained several former Hammond Organ Company staff for research and development , and ensured that production would partially remain in the United States . The new company produced their own brand of portable organs , including the XB @-@ 2 , XB @-@ 3 and XB @-@ 5 . Sound on Sound 's Rod Spark , a longtime Hammond enthusiast , said these models were " a matter of taste , of course , but I don 't think they 're a patch on the old ones " .

In 2002 , Hammond @-@ Suzuki relaunched the B @-@ 3 as the ' New B @-@ 3 ' , a re @-@ creation of the original electromechanical instrument using contemporary electronics and a digital tonewheel simulator . The New B @-@ 3 is constructed to appear like the original B @-@ 3 , and the designers attempted to retain the subtle nuances of the familiar B @-@ 3 sound . Hammond @-@ Suzuki promotional material states that it would be difficult for even an experienced B @-@ 3 player to distinguish between the old and new B @-@ 3 organs . A review of the New B @-@ 3 by Hugh Robjohns called it " a true replica of an original B @-@ 3 ... in terms of the look and layout , and the actual sound . " The instrument project nearly stalled after a breakdown in negotiations between Japanese and United States staff , the latter of whom insisted on manufacturing the case in the United States and designing the organ to identical specifications to the original .

The company has since released the XK @-@ 3 , a single @-@ manual organ using the same digital tonewheel technology as the New B @-@ 3 . The XK @-@ 3 is part of a modular system that

allows an integrated lower manual and pedals to be added . In response to some clones including a variety of vintage keyboards in a single package , Hammond released the SK series of organs , which include grand piano , Rhodes piano , Wurlitzer electronic piano , Hohner Clavinet and samples of wind and brass instruments alongside the standard drawbar and tonewheel emulation . Keyboard Magazine 's Stephen Fortner praised the single manual SK1 , indicated that it gave an accurate sound throughout the range of drawbar settings , and said the organ sound was " fat , warm , utterly authentic " . The XK @-@ 1c model was introduced in early 2014 , which is simply an organ @-@ only version of the SK1 .

In the US , Hammond manufactures a number of dedicated console organs , including the B @-@ 3mk2 and the C @-@ 3mk2 , and the A @-@ 405 , a Chapel Console Organ . The company has a dedicated Church Advisory Team that provides a consultancy so that churches can choose the most appropriate instrument .

= = Speakers = =

= = = Tone cabinet = = =

The authorized loudspeaker enclosure to use with a console organ was the Hammond Tone Cabinet , which housed an external amplifier and speaker in a box . The cabinet carried a balanced mono signal along with the necessary mains power directly from the organ , using a six @-@ pin cable . Spinet organs contained a built @-@ in power amplifier and loudspeakers , and so did not require a tone cabinet .

The tone cabinet was originally the only method of adding reverb to a Hammond organ ; reverb was not fitted to older organs . The most commercially successful tone cabinets were probably the PR series , particularly the 40 @-@ watt PR40 .

= = = Leslie speaker = = =

Many players prefer to play the Hammond through a rotating speaker cabinet known , after several name changes , as a Leslie speaker , after its inventor Donald J. Leslie . The Leslie system is an integrated speaker / amplifier combination in which sound is emitted by a rotating horn over a stationary treble compression driver , and a rotating baffle beneath a stationary bass woofer . This creates a characteristic sound because of the constantly changing pitch shifts that result from the Doppler effect created by the moving sound sources .

The Leslie was originally designed to mimic the complex tones and constantly shifting sources of sound emanating from a large group of ranks in a pipe organ . The effect varies depending on the speed of the rotors , which can be toggled between fast ( tremolo ) and slow ( chorale ) using a console or pedal switch , with the most distinctive effect occurring as the speaker rotation speed changes . The most popular Leslies were the 122 , which accepted a balanced signal suitable for console organs , and the 147 , which accepted an unbalanced signal and could be used for spinet organs with a suitable adapter . The Pro @-@ Line series of Leslies which were made to be portable for gigging bands using solid @-@ state amps were popular during the 1970s .

Leslie initially tried to sell his invention to Hammond , but Laurens Hammond was unimpressed and declined to purchase it . Hammond modified their interface connectors to be " Leslie @-@ proof " , but Leslie quickly engineered a workaround . The Leslie company was sold to CBS in 1965 and was finally bought by Hammond in 1980 . Hammond @-@ Suzuki acquired the rights to Leslie in 1992 ; the company currently markets a variety of speakers under this name . As well as faithful reissues of the original 122 speaker , the company announced in 2013 that they would start manufacturing a standalone Leslie simulator in a stomp box .

= = Tone generation = =

Although they are sometimes included in the category of electronic organs , the majority of Hammond organs are , strictly speaking , electric or electromechanical rather than electronic organs because the sound is produced by moving parts rather than electronic oscillators .

The basic component sound of a Hammond organ comes from a tonewheel . Each one rotates in front of an electromagnetic pickup . The variation in the magnetic field induces a small alternating current ( AC ) at a particular frequency , which represents a signal similar to a sine wave . When a key is pressed on the organ , it completes a circuit of nine electrical switches , which are linked to the drawbars . The position of the drawbars , combined with the switches selected by the key pressed , determines which tonewheels are allowed to sound . Every tonewheel is connected to a synchronous motor via a system of gears , which ensures that each note remains at a constant relative pitch to every other . The combined signal from all depressed keys and pedals is fed through to the vibrato system , which is driven by a metal scanner . As the scanner rotates around a set of pickups , it changes the pitch of the overall sound slightly . From here , the sound is sent to the main amplifier , and on to the audio speakers .

The Hammond organ makes technical compromises in the notes it generates . Rather than produce harmonics that are exact multiples of the fundamental as in equal temperament , it uses the nearest @-@ available frequencies generated by the tonewheels . The only guaranteed frequency for a Hammond 's tuning is concert A at 440 Hz .

Crosstalk or leakage occurs when the instrument 's magnetic pickups receive the signal from rotating metal tonewheels other than those selected by the organist . Hammond considered crosstalk a defect that required correcting , and in 1963 introduced a new level of resistor ? capacitor ( R / C ) filtering to greatly reduce this crosstalk , along with 50 ? 60 Hz mains hum . However , the sound of tonewheel crosstalk is now considered part of the signature of the Hammond organ , to the extent that modern digital clones explicitly emulate it .

Some Hammond organs have an audible pop or click when a key is pressed . Originally , key click was considered a design defect and Hammond worked to eliminate or at least reduce it with equalization filters . However , many performers liked the percussive effect , and it has been accepted as part of the classic sound . Hammond research and development engineer Alan Young said " the professionals who were playing popular music [ liked ] that the attack was so prominent . And they objected when it was eliminated . "

= = Clones and emulation devices = =

The original Hammond organ was never designed to be transported regularly . A Hammond B @-@ 3 organ , bench , and pedalboard weighs 425 pounds ( 193 kg ) . This weight , combined with that of a Leslie speaker , makes the instrument cumbersome and difficult to move between venues . Consequently , there has been a demand for a more portable , reliable way of generating the same sound . Electronic and digital keyboards that imitate the sound of the Hammond are often referred to as " clonewheel organs " .

The first attempts to electronically copy a Hammond appeared in the 1970s , including the Roland VK @-@ 1 and VK @-@ 9 , the Yamaha YP45D and the Crumar Organiser . The Korg CX @-@ 3 ( single manual ) and BX @-@ 3 ( dual manual ) were the first lightweight organs to produce a comparable sound to the original . Sound on Sound 's Gordon Reid said that the CX @-@ 3 " came close to emulating the true depth and passion of a vintage Hammond , " particularly when played through a Leslie speaker .

The Roland VK @-@ 7 , introduced in 1997 , attempted to emulate the sound of a Hammond using digital signal processing technology . An updated version , the VK @-@ 8 , which appeared in 2002 , also provided emulations of other vintage keyboards and provided a connector for a Leslie . Clavia introduced the Nord Electro in 2001 ; this used buttons to emulate the physical action of pulling or pushing a drawbar , with an LED graph indicating its current state . Clavia has released several updated versions of the Electro since then , and introduced the Nord Stage with the same technology . The Nord C2D was Clavia 's first organ with real drawbars . Diversi , founded by former Hammond @-@ Suzuki sales rep Tom Tuson in 2003 , has specialised in Hammond clones , and

featured a notable endorsement from Joey DeFrancesco .

The Hammond organ has also been emulated in software . The most prominent emulator in this field has been the Native Instruments B4 series , which has been praised for its attention to detail and choice of features . Emagic ( now part of Apple ) has also produced a software emulation , the EVB3 . This has led to a Hammond organ module with all controls and features of the original instrument in the Logic Pro audio production suite .

= = Notable users = =

Early customers of the Hammond included Dr. Albert Schweitzer , Henry Ford , Eleanor Roosevelt and George Gershwin . The instrument was not initially favored by classical organ purists , because the tones of two notes an octave apart were in exact synchronization , as opposed to the slight variation present on a pipe organ . However , the instrument did gradually become popular with jazz players . One of the first performers to use the Hammond organ was Ethel Smith , who was known as the " first lady of the Hammond Organ " . Fats Waller and Count Basie also started using the Hammond . Organist John Medeski thinks the Hammond became " the poor man 's big band " , but because of that , it became more economical to book organ trios .

Jimmy Smith began to play Hammond regularly in the 1950s , particularly in his sessions for the Blue Note label between 1956 and 1963 . He eschewed a bass player , and played all the bass parts himself using the pedals , generally using a walking bassline on the pedals in combination with percussive left hand chords . His trio format , composed of organ , guitar and drums , became internationally famous following an appearance at the Newport Jazz Festival in 1957 . Medeski says musicians " were inspired when they heard Jimmy Smith 's records . " " Brother " Jack McDuff switched from piano to Hammond in 1959 , and toured regularly throughout the 1960s and 70s . Keith Emerson was inspired to take up the Hammond by hearing McDuff 's arrangement of " Rock Candy " .

Booker T Jones is cited as being the bridge from rhythm and blues to rock . British organist James Taylor said the Hammond " became popular [ in the UK ] when people such as Booker T & The MGs and artists on the Stax Records label came over to London and played gigs . " Matthew Fisher first encountered the Hammond in 1966 having heard the Small Faces ' Ian McLagan playing one . When Fisher asked if he could play it , McLagan told him " They 're yelling out for Hammond players ; why don 't you go out and buy one for yourself ? " Fisher went on to play the organ lines on Procol Harum 's A Whiter Shade Of Pale , which topped the UK charts in the summer of 1967 . Steve Winwood started his musical career with the Spencer Davis Group playing guitar and piano , but he switched to Hammond when he hired one to record " Gimme Some Lovin ' " .

Gregg Allman became interested in the Hammond after Mike Finnigan had introduced him to Jimmy Smith 's music , and started to write material with it . His brother Duane specifically requested he play the instrument when forming the Allman Brothers Band , and he was presented with a brand new B @-@ 3 and Leslie 122RV upon joining . Allman recalls the instrument was cumbersome to transport , particularly on flights of stairs , which often required the whole band 's assistance . Author Frank Moriarty considers Allman 's Hammond playing a vital ingredient of the band 's sound .

Deep Purple 's Jon Lord became inspired to play the Hammond after hearing Jimmy Smith 's " Walk on the Wild Side " . He modified his Hammond so it could be played through a Marshall stack to get a growling , overdriven sound , which became known as his trademark and he is strongly identified with it . This organ was later acquired by Joey DeFrancesco . Van der Graaf Generator 's Hugh Banton modified his Hammond E @-@ 100 extensively with customised electronics , including the ability to put effects such as distortion on one manual but not the other , and rewiring the motor . The modifications created , in Banton 's own words , " unimaginable sonic chaos . "

The Hammond was a key instrument in progressive rock music . Author Edward Macan thinks this is because of its versatility , allowing both chords and lead lines to be played , and a choice between quiet and clean , and what Emerson described as a " tacky , aggressive , almost distorted , angry sound . " Emerson first found commercial success with the Nice , with whom he used and abused an L @-@ 100 , putting knives in the instrument , setting fire to it , playing it upside down , or riding it

across stage in the manner of a horse . He continued to play the instrument in this manner alongside other keyboards in Emerson , Lake and Palmer . Other prominent Hammond organists in progressive rock include the Zombies ' and Argent 's Rod Argent , Yes 's Tony Kaye and Rick Wakeman , Focus 's Thijs van Leer , Uriah Heep 's Ken Hensley , Pink Floyd 's Rick Wright , Kansas 's Steve Walsh , and Genesis 's Tony Banks . Banks later claimed he only used the Hammond because a piano was impractical to transport to gigs .

Ska and reggae music made frequent use of the Hammond throughout the 1960s and ' 70s . Junior Marvin started to play the instrument after hearing Booker T & The MGs ' " Green Onions " , although he complained about its weight . Winston Wright was regarded in the music scene of Jamaica as one of the best organ players , and used the Hammond when performing live with Toots and the Maytals , as well as playing it on sessions with Lee " Scratch " Perry , Jimmy Cliff and Gregory Isaacs . Tyrone Downie , best known as Bob Marley and the Wailers ' keyboard player , made prominent use of the Hammond on " No Woman , No Cry " , as recorded at the Lyceum Theatre , London , for the album Live !

The Hammond organ was perceived as outdated by the late 1970s , particularly in the UK , where it was often used to perform pop songs in social clubs . Punk and New Wave bands tended to prefer second @-@ hand combo organs from the 1960s , or use no keyboards at all . Other groups started taking advantage of cheaper and more portable synthesizers that were starting to come onto the market . The Stranglers ' Dave Greenfield was an exception to this , and used a Hammond onstage during the band 's early career . Andy Thompson , better known for being an aficionado of the Mellotron , stated that " the Hammond never really went away . There are a lot of studios that have had a B @-@ 3 or C @-@ 3 sitting away in there since the 70s . " The instrument underwent a brief renaissance in the 1980s with the mod revival movement . Taylor played the Hammond through the 1980s , first with the Prisoners and later with the James Taylor Quartet . The sound of the Hammond has appeared in hip @-@ hop music , albeit mostly via samples . A significant use is the Beastie Boys ' 1992 single " So What 'cha Want " , which features a Hammond mixed into the foreground ( the instrument was recorded live rather than being sampled ) .

Jazz musicians continued to use Hammond organs into the 21st century . Barbara Dennerlein has received critical acclaim for her performances on the Hammond , particularly her use of the bass pedals , and has modified the instrument to include samplers triggered by the pedals . Joey DeFrancesco embraced the instrument during the 1990s , and later collaborated with Jimmy Smith . He is positive about the future of the Hammond organ , saying " Everybody loves it . It makes you feel good ... I think it 's bigger now than ever . " Grammy @-@ winning jazz keyboardist Cory Henry learned to play the Hammond organ at age two and used it on 2016 's The Revival .