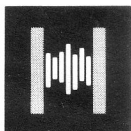
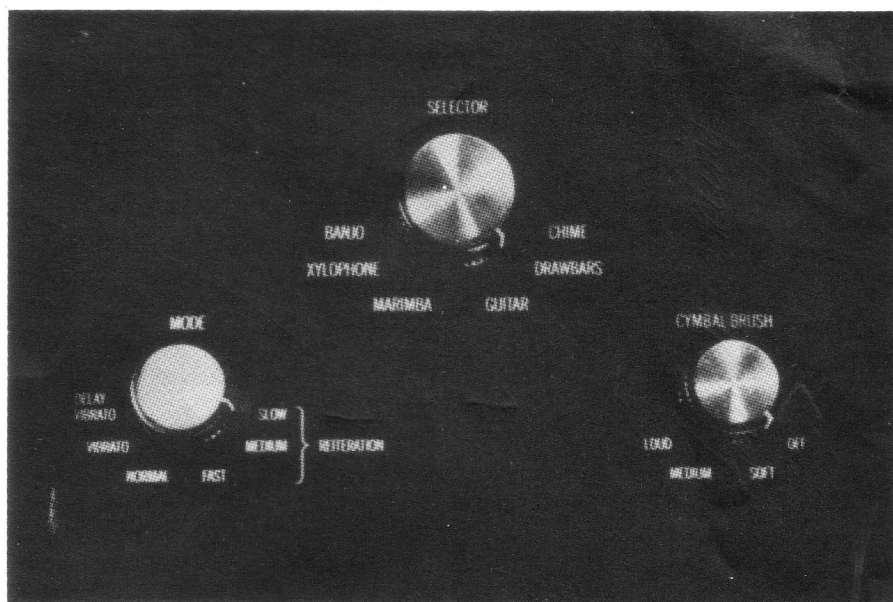


THE HAMMOND ORGAN
SERVICE INFORMATION
L-100A
SERVICE MANUAL
SUPPLEMENT



HAMMOND ORGAN COMPANY
DIVISION OF HAMMOND CORPORATION
4200 DIVERSEY | CHICAGO, ILLINOIS 60639

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L-100A PRESET PERCUSSION UNIT

When added to the L-100 series instrument, this unit adds five pre-voice percussion effects, including reiteration in three speeds. It also provides three percussion effects, "Normal (Non-Vibrato)", "Vibrato", and "Delayed Vibrato". For the rhythm accompaniment it also provides a "Cymbal-Brush" effect, the "Brush" being on the lower manual, and available when played in a legato fashion each time a key is depressed. The "Cymbal" is available on the pedal and sounds each time a pedal is depressed. The "Cymbal-Brush" control turns these effects on and selects the "Cymbal-Brush" volume.

SELECTOR SWITCH

With the "Selector Switch" in the "Drawbar" position, the signals from the upper manual harmonic busbars are routed to their proper drawbar in the upper manual group. The following is a breakdown of the harmonic switching used in this kit:

HARMONIC BUSBAR SWITCHING AND REITERATION SPLIT

UPPER MANUAL

The Sub-Fundamental, sub-third and eighth harmonics are not switched. The sixth harmonic busbar is used for percussion keying. With the "Selector Switch" in the "Drawbar" position, all harmonic busbars are routed to their proper drawbar.

REITERATION SPLIT

	<u>"A" CHANNEL</u>	<u>"B" CHANNEL</u>	<u>DRAWBARS</u>
Chime	2nd 3rd 4th (5th to Freq. Div.) (1-1/4 From Freq. Div.)		Fundamental
Guitar	Fundamental 3rd 4th 5th		2nd
Marimba	Fundamental	2nd	3rd 4th 5th
Xylophone	Fundamental	3rd	2nd 4th 5th
Banjo	2nd 3rd 4th 5th		Fundamental

MODE SWITCH

With the "Mode Switch" in any of the reiteration positions, the harmonics necessary to produce the "Chime", "Guitar", and "Banjo" are all fed into the "A" reiteration channel only, while the "Marimba" and "Xylophone" effects feed harmonics into both the "A" and the "B" channels. This split into the "A" and "B" channels only occurs with the use of reiteration. Without reiteration, all effects are routed into the regular percussion system. The two reiteration channels are identical. You will note that across the secondary windings of the two input transformers is located a field-effect transistor. These gates Q300 and Q303, are fed alternating pulses from a bistable multivibrator which supplies alternate pulses to each one of these gates. That is; one is on, while the other is off. These gates shunt the signal to ground, thereby making the channel inoperative. These individual signals are further amplified by a one stage transistor amplifier, Q301 for the "A" channel, and Q302 for the "B" channel. They are then mixed together and fed to a common amplifier, Q307, which in turn feeds this percussion signal to the input side of the swell pedal. The multivibrator which supplies the keying pulse for these two gates does not run continually, but rather it turned off and on each time a key is depressed on the upper manual. The multivibrator consists of Q305 and Q306. The multivibrator rate varies with the applied base voltage. This voltage is applied through the "Mode Switch" and R684 and R685. Q304 provides the necessary switch pulse to start the multivibrator.

NOTE: A. Whenever the reiteration is used, it completely bypasses the percussion section of the A0-42 amplifier.

With the "Mode Switch" in the "Normal", "Vibrato", or "Delayed Vibrato" position, the various pre-voiced percussions are routed to a percussion preamplifier made up of Q314 and Q313. These amplified signals are then routed into the regular Hammond percussion system at the collector of Q201. With the "Mode Switch" in the "Normal" position all percussion voices sound as normal; that is, they have no vibrato.

NOTE: B. To obtain the following vibrato effects it will be necessary to depress one or both of the "Vibrato" tabs.

With the "Mode Switch" in the "Vibrato" position, a portion of the percussion signal is taken from the input side of the Expression pedal and routed through R670, the "Mode Switch", and is then fed to the grid of V1 A (Pin 2). Here the percussion voices are amplified and fed to the vibrato phase shift amplifier. All voices so routed now appear with vibrato.

With the "Mode Switch" in the "Delayed Vibrato" position, a portion of the percussion signal is taken from the input side of the Expression pedal, and routed to a voltage divider made up of R682 and R681. This weak signal is fed to the base of Q312. It will be noted that the emitter of this stage is not bypassed and that the output of this stage is relatively low. During keying, after a predetermined time lag (.5 seconds), the charge on C631 is depleted by Q308 and Q309. With this charge depleted, Q308 and Q309 stop conducting and their respective collectors assume the supply potential +12V. This +12V. from the collector of Q309 is now applied to the base Q310, thereby placing Q310 and Q311 in a state of conduction. With Q311 now conducting, C633 is placed across the emitter resistor of Q312. This materially increases the gain of this stage, and as the percussion is dying away, feeds this amplified portion of the fading percussion signal through the "Mode Switch", and R683 to the grid of V1 A (Pin 2). There the signal is amplified and fed to the Vibrato Phase-Shift amplifier. All voices so routed now appear with a vibrato tail-off.

Two positions of the "Mode Switch", "Vibrato", and "Delayed Vibrato" also effect the normal Hammond percussions when they are in use (See Note "B" above).



FIGURE 5-5.
SCHEMATIC DIAGRAM
AND PARTS LAYOUT,
L-100A PERCUSSION UNIT

FREQUENCY DIVIDER

When using the "Chime" voice, it is necessary to create a 1-1/4 harmonic for the proper reproduction of the "Chime" tone. This is accomplished by routing the 5th harmonic into an amplifier made up of Q-315 and Q-316. Q-317 rectifies and further amplifies this pulse which is then fed to a two-stage frequency divider, made up of Q-318, Q-319, Q-320, and Q-321. The output of this second frequency divider is then routed back to the "Selector Switch", and is used as one of the harmonics in the "Chime" voice.

NOTE: Because a frequency divider can handle only one frequency at a time, any attempt to play two or more "Chime" notes at a time will result in distortion.

CYMBAL AND BRUSH

The "Cymbal-Brush" switch when in the "off" position disables the keying functions necessary to produce the "Brush" effect. With the "Cymbal-Brush" switch in any one of the "on" positions, the 8th harmonic of the lower manual is disabled and this harmonic busbar is used for keying the "Brush" effect. The pedal signal (keying) contact is used to activate the "Cymbal" effect each time a pedal is depressed.

BRUSH KEYING

With the "Cymbal-Brush" switch in any of the ON positions, the base of Q322 is routed now to the 8th harmonic busbar in the lower manual. Anytime a key is depressed, the base voltage of this transistor is routed to ground, and this stage stops conducting. The attendant rise in collector voltage is impressed on one plate of C608. The other plate of C608 responds by driving excess electrons off to ground through resistor R624. The resultant positive voltage is then fed through D203 to the base of Q323, the "Brush" gate. To the base of this "Brush" gate is also fed the noise from the noise generator Q324. This noise is now tuned in the collector circuit and fed to the "Cymbal and Brush" amplifier which consists of Q325 and Q326.

CYMBAL KEYING

Anytime a pedal is depressed, the pedal signal is routed to the pedal drawbar. A portion of this same signal is also fed to Q327 and Q328. These stages amplify and shape the signal and feed it through R612 to the base of Q330, and through R613 and D205 to a R/C storage network and the base of Q329. The signal developed across R616, the emitter resistor of Q330, is rectified by D204 and this positive voltage is applied to the base of Q331, the "Cymbal" gate, turning it on. At the same time, the output of Q328 is being rectified by D205 and slowly applied to the base of Q329. When Q329 is biased into conduction it depletes the base bias normally supplied to Q330 through R612 and Q330 stops conducting. In this state, no signal is available at the emitter of Q330 to be rectified, and Q331, the "Cymbal" gate, slowly turns off. To the base of this "Cymbal" gate is also fed the noise from the noise generator, Q324. This noise is tuned in the collector circuit of Q331 and fed to Q325 and Q326 the "Cymbal and Brush" amplifier.

BRUSH AND CYMBAL AMPLIFICATION

After being amplified by Q325 and Q326, the "Brush and Cymbal" signals are routed to a voltage divider consisting of R604, R605, and R606. It is then tapped by the switch and routed to R602 the overall level control. This is located on a terminal strip on the lower organ shelf, near the A0-43 amplifier. The wiper of the overall level control (R602) now feeds into the A0-43 amplifier through R601 and C318 to Pin 7 of V8. To enhance the "Brush and Cymbal" effects, a small high frequency speaker is attached to the main amplifier. It is located under the lower right hand end block on the organ.

POWER SUPPLY

Power supply chassis is supplied with +340 volts DC from A0-43 amplifier. +80 volts required for percussion assembly is obtained from voltage divider R690, and R691. +12 volts is obtained from Zener Diode D201.