

① Mod Wheel Addition

- Solder a B100k pot to M4240-MA1M (there are solder pads on r. side of board)
- Remove jumper MX14B from M4240-MA1M
- Wire up a momentary SPST between SI5 and KC7
 on M4240-MA1M ← pin 4 of 74HC273
 ← at pin 6 of 2nd upper ribbon cable
 this board is underneath M4240-MA1M
- Mount B100k pot and momentary SPST near pitchbender

② APO Defeat:

Description: Since the chord voice is being permanently removed, this mod uses the Lower Tone Select key matrix switch to constantly provide input to the microprocessor, essentially fooling it that the user is always pressing that button and therefore always resetting the 6-min turn off APO timer. Since there's no chord voice output, it has no impact on the sound.

There's a spare analog switch/transmission in the ⁴⁰⁶⁶ on M240-MA1M board that's used here.

pre A. Wire up the LFO circuit and you'll be using the squarewave output of that circuit to drive the gate of the analog switch

A. Use a Dremel or X-acto or utility knife to etch away the PCB traces around pins 3, 4, 5 of CD4066 on M4240-MA1M. Make sure they're totally isolated!

B. Connect KC3 (on M4240-MA1M) to pin 4 of CD4066
 CD4049 pin 6 (on M4240-MA1M)

C. Connect SI6 (on M4240-MA1M) to pin 3 of CD4066
 74HC273 pin 2 (on M4240-MA1M)

D. Wire the output of LFO 1's squarewave (pin 7 of TLC2274) to pin 5 of CD4066
 on signal daughterboard

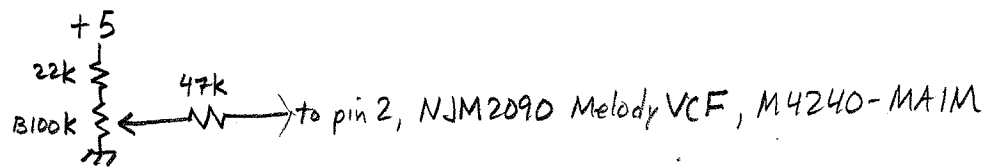
③ Memory Backup Battery

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- On a small piece of perfboard, build the battery backup circuit (battery daughterboard)
- Desolder the long red jumper wire near the '6264 RAM chip on M4240-MA1M
- Solder +VDD and GND from near the '256 ROM chip (on M4240-MA1M) to the battery daughterboard
- Solder the +VBAT from the battery daughterboard near pin 1 of the '6264 RAM chip, M4240-MA1M
- Mount battery daughterboard inside HT700. Recommend upper-left corner of keyboard case.

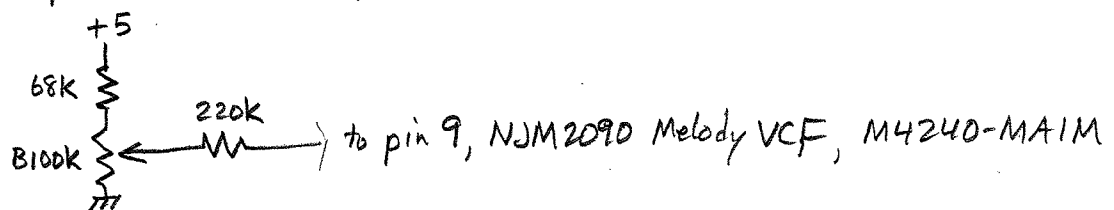
④ Cutoff and Resonance Controls for Upper Tone/Main Voice

- Desolder 5.1k resistor connected to pin 11 of Melody VCF on M4240-MA1M
- Replace 5.1k resistor with 6.8k resistor
- Wire up the Cutoff pot as shown in schematic.



Note: since pots will probably be mounted near the pitch bender, you can get +5 and GND from the pitch bend pot. It's also advisable to have the 47k resistor soldered to the middle terminal of the CF pot.

- Desolder the jumper (near the right-sided oval hole in PCB) that comes from the Music LSI to the Melody VCF
- Wire up the Resonance pot as shown in schematic



Note: again, since this pot will probably be mounted near pitch bender, you can use +5 and GND from there. Also, the 220k resistor could be soldered to the Res. pot central terminal. I could have used the on-board 220k, but then I'd have to cut a trace.

- Mount the pots near the pitch bender, left side of keyboard

⑤ Disable the Chord Voice

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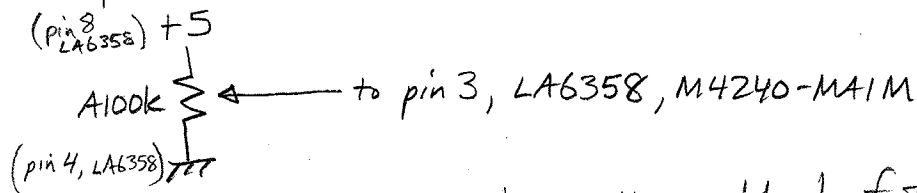
③

Description: This essentially involves removing the VCF enveloping that comes from the Music LSI for the Chord Voice, as well as the Chord Muting, and some bleed through in the switching. You can't just cut the Chord voicing coming from the Music LSI because, when Accompaniment is OFF, the AT-700 uses the 4 voices in the Chord output to provide the 8-voice polyphony (routing them all through the Melody VCF)

- Cut trace between LA6358 pin 5 and Music LSI, MPD 935 pin A00
all on M4240-MA1M
- Cut trace between LA6358, pin 3 and Music LSI, MPD 935 pin A01
all on M4240-MA1M
- Desolder & remove 2.2M Ω resistor connected across pins 10-11 of CD 4066 on M4240-MA1M

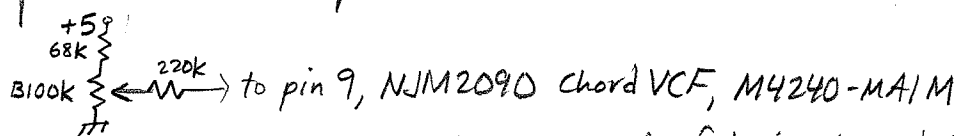
⑥ Provide Cutoff and Resonance controls to Chord VCF (becomes bass/drums VCF)

- Desolder 5.1k resistor connected to pin 11 of Chord VCF on M4240-MA1M
- Replace 5.1k resistor with 6.8k resistor
- Wire up the cutoff pot as shown in the schematic



Note: I mounted these pots on the right side of the keyboard, so I had to get +5 and GND from the LA6358 power rails. Also, I'm not sure if an audio taper pot was the best choice, but it seems to work OK

- Desolder jumper (near pin 9 of NJM2090, Chord VCF, M4240-MA1M) that comes from Music LSI to the Chord VCF.
- Wire up the Resonance pot as shown in the schematic



Note: Again, with pots mounted on right side of keyboard, need to get +5 and GND from around the VCF chip - there are several places.

- Mount the pots to the right side of keyboard.

7 Removing Muting from all Voices

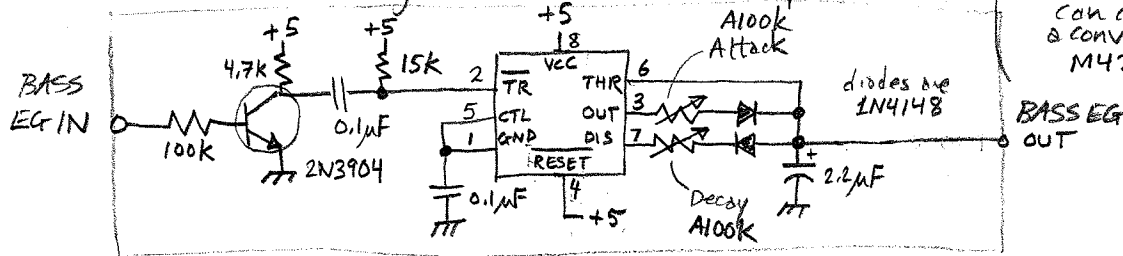
Note: While the HT-700 has programmable DCA's, all amplitude modulation occurs within the Music LSI itself, so each VCF is at the end of the signal path. (That's probably why Casio tamed the Resonance on the NJM2090's). Casio's other solution for reducing noise was having active pull-downs at the Melody and Chord VCF outputs, and the Bass outputs. These are done pretty coarsely, so this mod removes them. BUT removing them means the HT-700 is noisier than stock.

- Desolder and remove 1 μ F electrolytic capacitor connected to drain of T1 FET, M4240-MA1M
- Desolder and remove 1 μ F electrolytic capacitor connected to drain of T2 FET, M4240-MA1M
- Desolder and remove 10k resistor between base of T4 BJT and pin P2/BMUTE of Music LSI, M4240-MA1M

8 Adding Bass Envelope Generator

Description: Adds a simple AD generator (a simplified Jacky ADSR). The Music LSI already generates a Bass Envelope, so this isn't fully necessary, but it does give more control over the Bass signal filtering. This is one circuit on the signal daughterboard (of three).

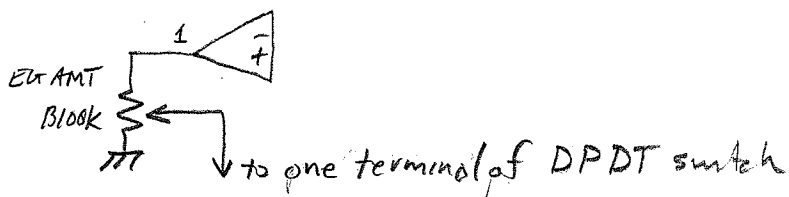
- Build the following circuit on a small perfboard. (+5 & GND can come from a convenient place on M4240-MA1M PCB.)



- Desolder and remove NJM4558 8-pin dual op amp from upper right corner (viewed from solder layer side) of M4240-MA1M
- Replace with TLC2272 8-pin rail-rail LinCMOS dual op amp (or high Z-in, rail-rail equivalent). Note: It is pin-compatible w/4558.
- Desolder and remove all input components to pins 2 & 3 of TLC2272 op amp. These are:
 - 22nF capacitor @ pin 3
 - 47nF capacitor @ pin 2
 - 22k resistor @ pin 3
 - 22k resistor @ pin 2

⑧ Adding Bass Env Generator (continued)

- E. Connect a wire from base of T5 BJT to BASSEG IN on the signal daughterboard
- F. Connect a wire from signal daughterboard BASSEG OUT to pin 3 of the TLC2272 op amp, on M4240-MAIM
- G. Wire up the Attack and Decay pots (both 100k) and mount them between the volume sliders and the LCD display (inside: underneath the MIDI jacks & sustain pedal jack).
- H. Connect pin 1 of the TLC2272 op amp to a 100k pot as shown in the schematic



- I. Connect the wiper of the pot to one terminal of a DPDT switch
- J. Mount the EG AMT ^V and DPDT switch near the Attack & Decay pots.
potentiometer

⑨ Routing Drums through the Filter

Note: The drumsignal needs some gain before it can be filtered.

- A. Desolder and remove 1 μ F electrolytic cap connected to pin 1 of TLC2272, M4240-MAIM
- B. Desolder and remove 1 μ F electrolytic cap connected to pins 6-7 of LA6358, M4240-MAIM
- C. Desolder and remove 27k resistor connected to pin 6 of TLC2272, M4240-MAIM
- D. Desolder and remove 10k resistor between pins 6-7 of TLC2272, M4240-MAIM
- E. Replace that 10k resistor with a 22k resistor
- F. Desolder jumper connected to pin 7 of TLC2272, M4240-MAIM
- G. Solder a jumper wire between pins 6-7 of LA6358, M4240-MAIM (use old 1 μ F electrolytic cap thru hole, if desired) and ACC out signal trace

9) Routing drums through the Filter (continued)

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- H. Solder one terminal of a 1 μ F capacitor to the resistive summing node before the Percussion filter (see to drums amp on schematic)
- I. Wire the other terminal of the capacitor to the 10k resistor feeding into the drums amp (conserve other old 1 μ F electrolytic cap thru hole, if desired; see steps 9.B and 9.G)
- J. Wire output of drums amp, pin 7 of TLC2272 to kitty-corner terminal of DPDT switch in step 8.I (see schematic)
- K. Solder a 47k resistor to "neighbor" DPDT pin of step 8.J and wire the other side of the resistor to GND (find on M4240-MAIM PCB)
- L. Wire one central terminal of DPDT switch to pin 5 of LA6358, M4240-MAIM (input to Chord VCF Control Circuit) - see schematic and PCB layout drawings

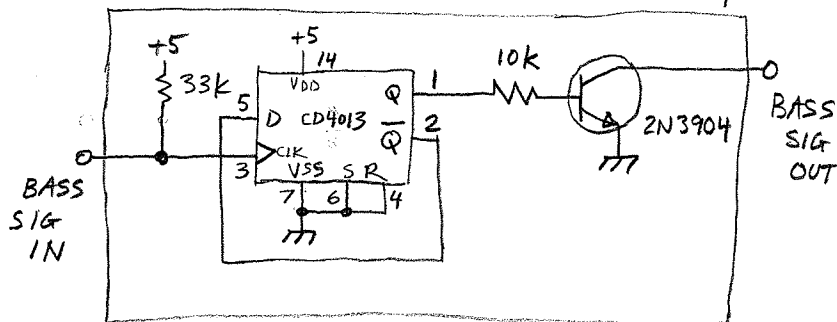
10) Octave Drop on Bass Signal

A. Remove jumper near upper left corner of ^{Music LSI} μ PD 935 M4240-MAIM that connects to BAS signal

B. Remove jumper as shown on PCB drawing and schematic

C. Wire a jumper from BAS signal of Music LSI to pin 23 of microprocessor UPD78C10 (you can use old jumper thru hole from here and other old jumper thru hole from here)

D. Build the following octave drop circuit on the signal daughterboard (this is the 2nd circuit on this perfboard)



E. Wire BAS (pin 23 UPD78C10) to one central terminal of a new DPDT switch

⑩ Octave Drop on Bass Signal (continued)

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- F. Wire BASS SIG IN and BASS SIG OUT to "neighbor" outer terminals on the DPDT switch
- G. Wire the other two "neighbor" outer terminals together on the DPDT switch
- H. Wire the other central terminal of the DPDT switch to the other old jumper thru hole from step 10.B (see schematic and PCB drawing)
- I. Mount DPDT switch in old RAM card section

⑪ Routing Bass Signal Through the Filter

- A. Desolder and remove 33nF capacitor at emitter of T4, M4240-MA1M
- B. Replace 33nF with 10 μ F electrolytic cap, (+) terminal towards top of PCB
- C. Solder a wire to remaining outer terminal of Bass/Drums DPDT switch from section 9
- D. Desolder and remove 10 μ F connected to pin 18 of chord VCF, NJM2090, M4240-MA1M
- E. Solder a wire from remaining central terminal of Bass/Drums DPDT switch to pin 18 of chord VCF NJM2090D, M4240-MA1M
- F. Mount DPDT switch near Attack Decay pots under MIDI jacks

⑫ Drums Pitch Control

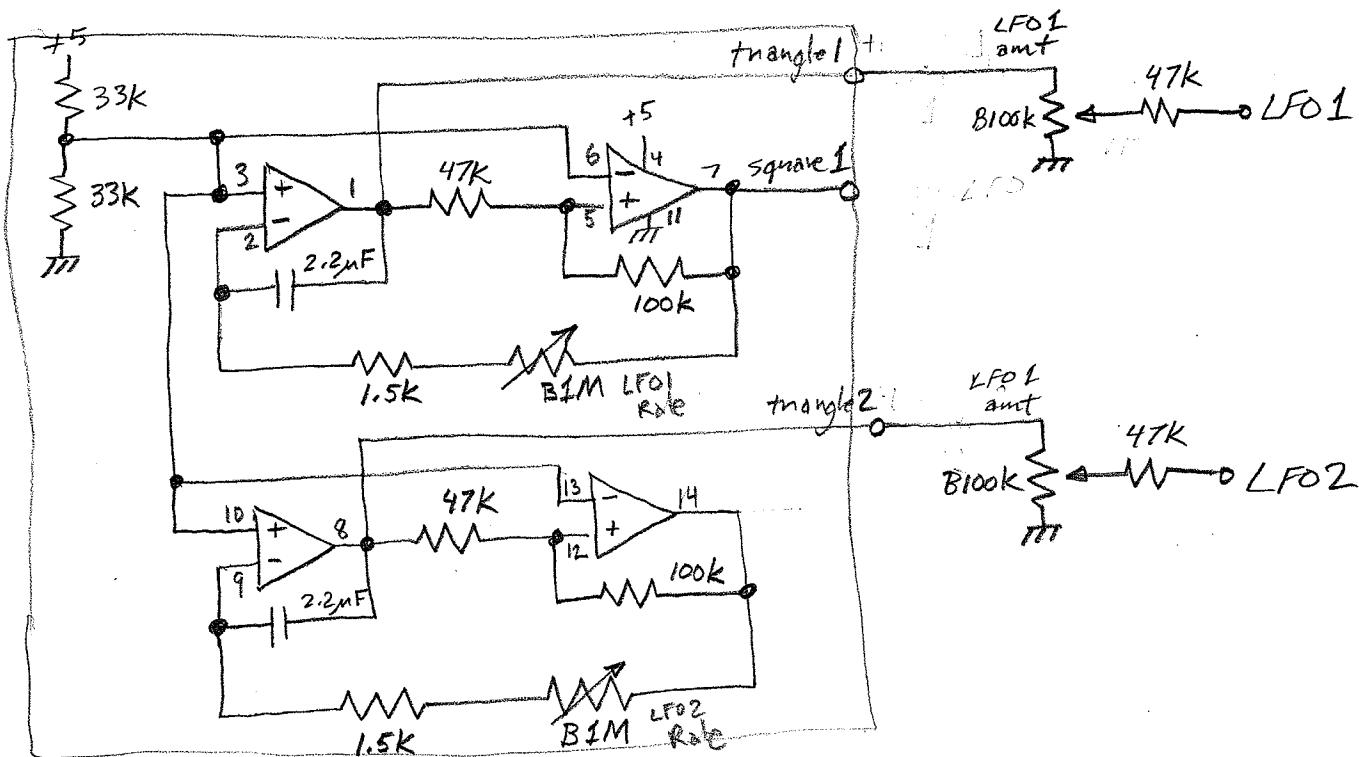
- A. Solder a 560pF capacitor across 100pF capacitor in Oscillator 3 circuit (see schematic and PCB drawing)
- B. Solder a 100k pot across pin 4 of 74HC04 chip and lower terminal of capacitor (see schematic and PCB drawing)
- C. Mount the 100k pot on back of HT-700, next to the power jack

13) Adding LFO's to VCF's

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A. Build the following circuit on the signal daughter board (this is the 3rd circuit on the perfboard)



- Notes:
- ▷ op amps are from single quad 14-pin TLC2274 (quad LinCMOS rail-rail)
 - ▷ potentiometers are panel mounted on HT-700, in old RAM card slot - they're NOT on the perfboard;
 - ▷ range of each LFO is about 0.4 - 100 Hz

B. As shown above, wire up 2 "LFO amount" B100k pots using +5 and GND from signal daughterboard. Solder a 47k resistor to the central terminal of each LFO amt pot.

C. From other end of LFO1 47k resistor, solder a wire to pin 2 of Melody VCF, NJM2090, M4240-MAIM

D. From other end of LFO2 47k resistor, solder a wire to pin 2 of Chord VCF, NJM2090, M4240-MAIM

E. Don't forget to wire square 1 as described in Section 2 for APO defeat

Note: In the HT-700, chorus is globally applied to all voices.

I personally find that Chorus can defeat the power of a bass sound, so this mod allows you to reroute the bass signal from the Accompaniment mix (which gets the global chorus setting) to the Rhythm mix, which never receives Chorus. This means that you can keep the Chorus processing on the Main Melody voice while having the Bass be in mono. Note that when you're not using the Bass, you need to have this switch off to get all 8 voices of polyphony with Chorus.

A. Also, I don't have the ^{M4240-MA2M} PCB drawing of the HT700's board with the Chorus circuitry, so you'll just have the schematics.

- A. Remove jumper near op amp mixer that runs to pin 2 of 4558 (HT3K service manual says these are M5218's, but in the HT700, they're 4558's). The jumper is after the I_{in} cap but before the 10k resistor on M4240-MA2M
- B. Wire one outer terminal of an SPDT switch to the ⁴⁵⁵⁸ side of the jumper through hole.
- C. Wire the central terminal of the SPDT switch to the other side of the jumper thru hole
- D. Solder to the other outer terminal of the SPDT a 22k resistor
- E. To the other end of 22k resistor, solder a wire to pin 6 of the 4558
- F. Mount the switch on the HT-700 panel near the LFO pots in the old RAM end slot