AtomaHawk Construction and Installation Instructions

AtomaHawk Version 1.4

These installation instructions are for the AtomaHawk kit that began shipping in November 2016. If you received your kit BEFORE November 2016 then you should contact technical support at support@hawk800.com and we will provide details on how to proceed.

This kit is designed to be installed in the Korg Poly-800, the Poly-800 MK2 and EX-800 but the HAWK-800 upgrade must have been installed in those synthesizers prior to installation of the AtomaHawk kit. You cannot install this kit without the HAWK-800 version 1.5 kit already installed in your Poly-800.

Congratulations!

Congratulations on your purchase of the AtomaHawk retrofit kit. This kit provides your Poly 800 Mk1 and MK2 or EX-800 with control over the three most common hardware hacks for this instrument. They are:

1. The “Moog Slayer” (or extreme resonance) modification.
2. The “FM-800” or DCO sourced VCF modulation.
3. The 12/24db filter slope switch.

The most important benefits of using this kit instead of the original hardware modification hacks are:

1. You don't have to drill holes in your synthesizer to obtain the benefits of these great modifications.
2. The settings of the new modifications are saved in patch memory for easy recall.
3. MIDI controller messages can be used to control the modifications.
4. The modifications can be influenced by LFO, EG etc.
5. If you have already carried out the original modifications, you can still install this kit and use the original controls in tandem with the AtomaHawk kit.

Prerequisites

You MUST have already installed the HAWK-800 before you can install this kit. This kit will NOT work without the HAWK-800 kit already installed. Also, this version of the AtomaHawk kit MUST be used with HAWK-800 kit version 1.5 (or higher).

To get further details on the Hawk-800 and AtomaHawk kits go to http://www.hawk800.com

WARNING and DISCLAIMER

You take full responsibility for any outcome, good, bad or ugly, when constructing, installing and using this retrofit kit. Do NOT attempt to construct, install or use this retrofit kit unless you understand and are willing to accept responsibility for any outcome that may result from your own attempts to construct, install and use this kit.
NOTE: This kit requires the removal of one component from the main Poly 800 printed circuit boards (PCB's) and also requires soldering multiple wires into the main board of the instrument. This requires electronics technician skills. If you do not have the skills required to remove components and patch in hook up wire then you should have someone else do the job for you. Your local music store should be able to help you to find a qualified technician in your area.

Safety First

NOTE: Remember to approach your work with patience, care and appropriate safety precautions.

Before you Begin

It is critically important to make sure that you received all of the components in the kit and that none of the components show any sign of physical damage. Check that you received all of the components in the quantities listed in the bill of

materials sheet that was provided with your AtomaHawk kit. You can also download the BOM from www.hawk800.com. Also visually inspect each component and ensure that there is no sign of any physical damage.

Preparation

The basic steps involved in the successful completion of this project are:

1. Read these instructions and understand the steps and tasks required.
2. Check the kit for delivery of all components physically undamaged.
3. Obtain the needed tools and supplies.
4. Backup your Poly-800 global, patch and sequencer data.
5. Construct the new retrofit board (AtomaHawk v1.4).
6. Open up the Poly-800 Mk1, MK2 or EX-800.
7. Remove the main board (KLM-596 or KLM-1032), remove capacitor C103 and then replace the main board.
8. Install capacitor C103 on the AtomaHawk board.
9. Remove the HAWK-800 board, install the new AtomaHawk connector socket and then replace the HAWK-800 board (and test the synth).
10. Attach wire sets to the AtomaHawk board.
11. Attach the wire sets to the main board and install the AtomaHawk board on its mounting point.
12. Attach the AtomaHawk to HAWK-800 ribbon cable set.
13. Download the latest version of software for the HAWK-800 (this version of AtomaHawk requires version 2.65 or higher). This AtomaHawk kit will **NOT** operate correctly with HAWK-800 software **below version 2.65**.
14. Set global parameter 58 to value 1. This enables the software to control AtomaHawk kit version 1.4. Setting 0 is for previous versions (below 1.4) of the AtomaHawk kit.
15. Test the three new modifications and then begin using your upgraded synthesizer.

Read the Instructions

It is very important that you read these instructions through to the end first before beginning any work. This should give you a good understanding of the steps involved in the project. If you need assistance you can contact support@hawk800.com for additional explanation of any part of these instructions. This project requires patience and about 1 hour to complete. You should plan to set aside 2 hours so that you have plenty of time to focus on each task. Do NOT rush any step in this project. It is better to take extra time instead of ruining your synthesizer or the retrofit kit.

Before you Begin

It is important to make sure that you received all of the components in the kit and that none of the components show any sign of physical damage. Use the bill of materials that came with the kit to ensure that the correct kit and parts have been supplied.

Required Tools and Supplies

To construct and install this kit will require (at minimum) the following tools:

1. Phillips screwdriver.
2. Small (2.5) flat blade screwdriver.
3. Small side cutter.
4. Small long nose pliers.
5. Pair of tweezers.

6. Suitable Soldering iron (around 20/40 watts with fine soldering tip).

You will need to obtain the following supplies:

1. Rosin core solder standard 60/40 formula for electronics work. Approx. 0.032” diameter.

Backup your Poly-800 Mk1 or EX-800 Patch and Sequencer Data

You should now back up your global, patches and sequencer data. This is important because if you reverse the orientation of the Atomahawk to HAWK ribbon cable then you will probably cause corruption of the user data. Please do NOT reverse the orientation of the cable. That is bad.

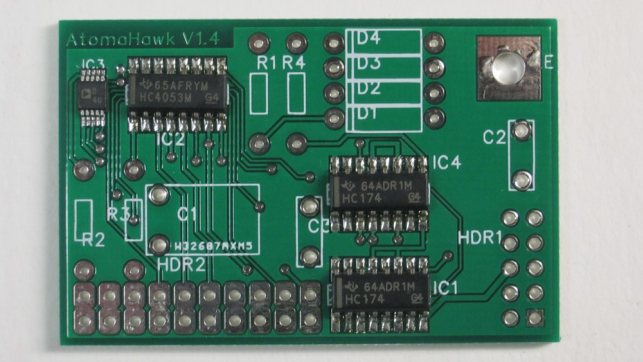
IMPORTANT – AtomaHawk Board Versions 1.4

AtomaHawk version 1.4 can easily be identified because it uses surface mounted components. All previous versions of the AtomaHawk kit use only through hole components.

Constructing the AtomaHawk Printed Circuit Board

At this point, you should have obtained all of the needed tools and supplies to carry out the entire project. And you probably should have backed up your global, patch and sequencer data too (although it is not actually necessary). You are now ready to construct the AtomaHawk PCB.

Step 1 – Prepare a work space

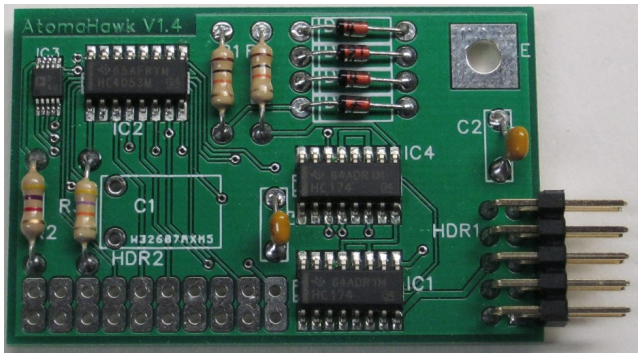


First, you need to prepare a work space. Find a flat surface (a kitchen table or work bench is recommended) to work on. You will need a flat area about 1 meter square (3 feet x 3 feet).

Step 2 – Installing the Discreet Components on the Version 1.4 Board

We are now ready to install the discreet components. The picture above right shows the AtomaHawk board populated with the four surface mounted IC's. Check that the orientation of the IC's on your board matches the picture. If any of the IC's are not oriented according to the picture then email support@hawk800.com. If the IC's are OK then proceed to install the discreet components.

- Install the four signal diodes (D1, D2, D3, D4). The white bars on the PCB are to the left and should match orientation with the black stripe that is on the signal diodes themselves.
- Install the two (2) 10K ohm resistors (R1 and R4). They are located to the left of the signal diodes.
- Install the 4K7 ohm resistor (R2). It is located on the bottom left hand side of the picture.
- Install the 47K ohm resistor (R3). It is located on the bottom left hand side of the picture but to the right of R2.
- Install the two capacitors (C2 and C3).



The picture (right) shows all of the signal diodes, resistors and capacitors installed in their correct locations.

NOTE: Check for correct orientation of the four signal diodes with the black band on the left hand side.

NOTE: Be careful to ensure that you install the 4K7 (yellow, purple, red) resistor in position R2 (left) and the 47K (yellow, purple, orange) in the position R3 (right).

Step 3 – Installing the 10 Pin Ribbon Cable Plug

Install the 10 pin right angle header plug as shown in the picture (bottom right corner) above.

Step 4a – Opening the Poly-800 or Poly-800 MK2

If you are installing the kit into an EX-800 then jump to step 4b.

- Place the Poly-800 (or Mk2) face down (keyboard down) with the rear facing toward you.
- Remove the 3 short screws from the front edge of the keyboard.
- Remove the 9 medium length screws from the perimeter of the keyboard.
- Remove the 4 threaded screws from the bottom of the keyboard.
- Set the screws aside somewhere safe where they will not be lost or misplaced.
- Carefully lift and then hinge the bottom section of the Poly-800 rolling it over to bring it toward you. Ensure that you do not strain the wire bundles that join the bottom section to the top section of the keyboard.
- Remove the two guitar strap pegs and set them aside somewhere safe where they will not be lost or misplaced.

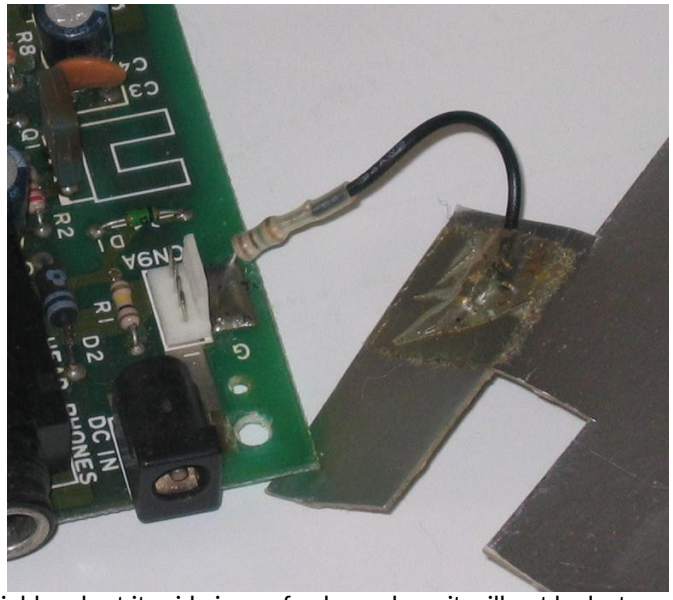
Step 4b – Opening the EX-800

If you are upgrading an EX-800 then do the following.

- Remove the four (4) small black screws from the upper rear edge of the EX-800.
- Remove the four (4) small black screws from the left and right hand sides of the EX-800.
- Set aside the screws in a safe location where they will not be lost or misplaced.

Step 5 - Remove the main board

- Locate the main board KLM-596 (for the Mk2 the main board is KLM-1032) and small brown secondary board (KLM-601) and disconnect ALL cable assemblies and remove the mounting screws so that you can remove the main board and small secondary board from the Poly-800.
- Set aside the 9 screws in a safe place where they will not be lost or misplaced.
- Carefully remove the main board (along with the RFI shield) and secondary board all together.

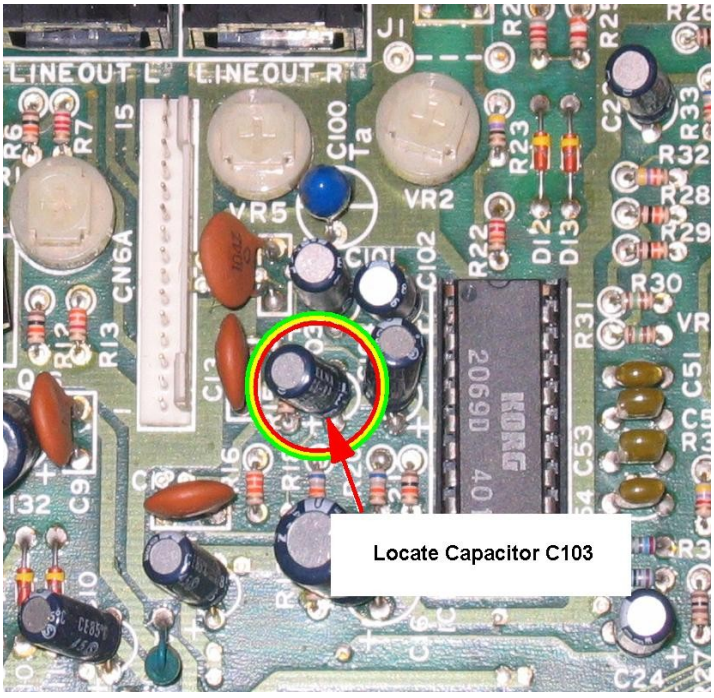


- Disconnect the RFI shield and set it aside in a safe place where it will not be lost or misplaced.

Step 6 – Removing Capacitor C103 from the Main Board

Now carefully remove capacitor C103 from the main board (do not discard the capacitor).

- Using the picture at right to help locate and then remove capacitor C103 from the main board. IMPORTANT: This capacitor is going to be reused so be careful to remove it without damaging it.



Step 7– Reinstall the Main Board into your Synthesizer

Install the main printed circuit board assembly back into your synthesizer. Reattach all cable assemblies (except cables CN2 and CN3 for the Poly-800 and Poly-800 Mk2). Double check to ensure that you reconnect the RFI shield connection to the main board. Also ensure that all cable assemblies are connected properly.

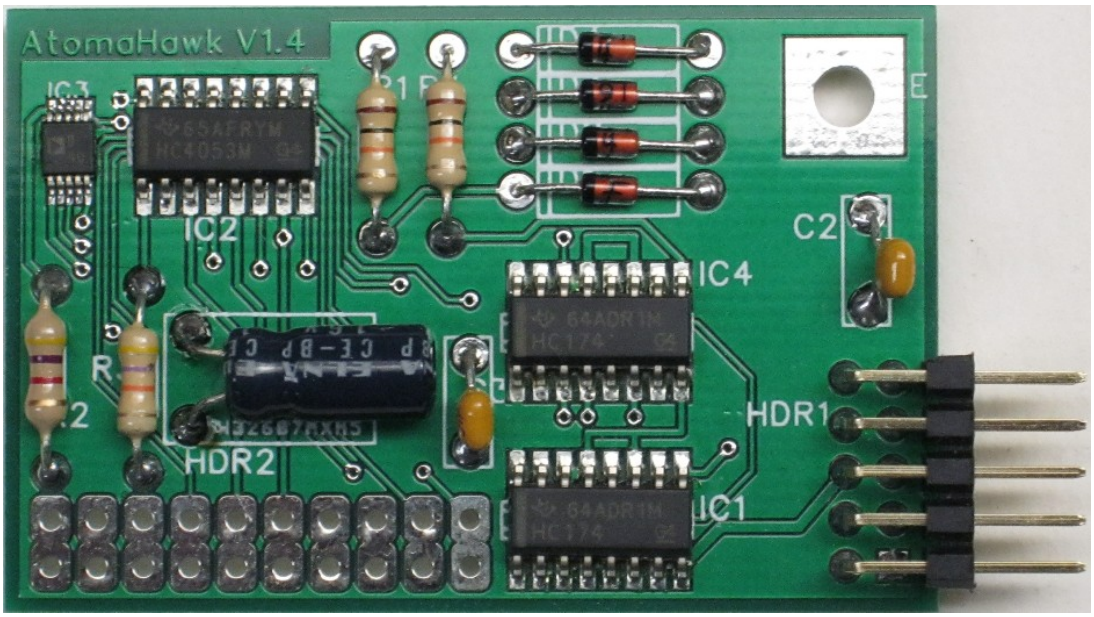
Step 8 – Install Capacitor C103 into the AtomaHawk Board

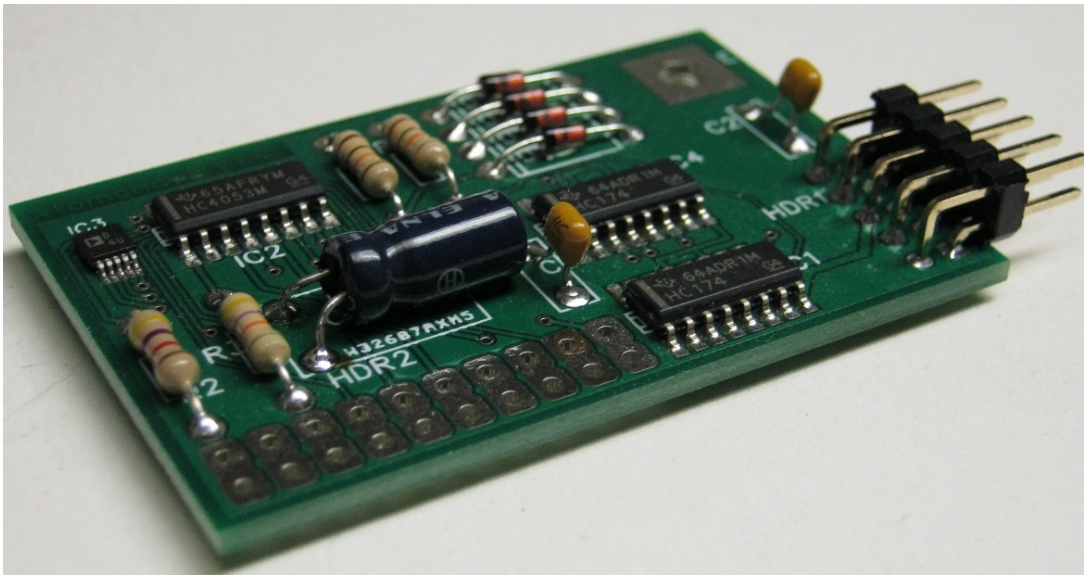
Install capacitor C103 into position C1 in the AtomaHawk board.

- Using the picture below as a guide, install capacitor C103 into the AtomaHawk board.
- Use the two pictures shown below that show how the capacitor can be installed almost flat on the board if care is taken to position the capacitor legs at right angles and slightly but not fully inserted through the PCB holes.
- IMPORTANT: In the EX800, it is necessary to lean the C103 capacitor over as far as you can so

that it does not interfere with the display board.

- The polarity of the installation of this capacitor does not matter. It can be installed in either direction without any problem.





IMPORTANT: Attaching Hook Up Wires

Ten (10) hook up wires must be installed between the AtomaHawk board and the main board. Installation of these wires requires special care.

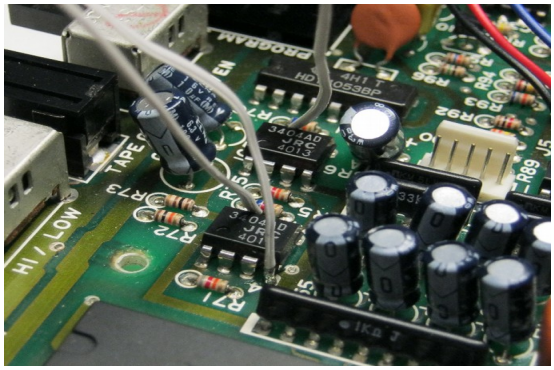
1. Take care to ensure that the ends of the wires are only stripped back by a sixteenth of an inch (2-3mm).
2. Ensure that no stray strands of wire cause a short to other pins or components nearby.
3. It will be necessary to rotate the main board into different positions so that you can solder the wires without touching (and melting or damaging) other components. Use care to be sure that you position the board so that damage to other wires or components does not occur.
4. Attachment of hook up wires to the main board and AtomaHawk board is made significantly easier with the use of a pair of tweezers. Do not grip the wires too close to the end being soldered because the gripping force and the heated wire strands will cause the plastic insulation to melt and deform. Hold the wires at least half an inch away from the end that is being soldered.

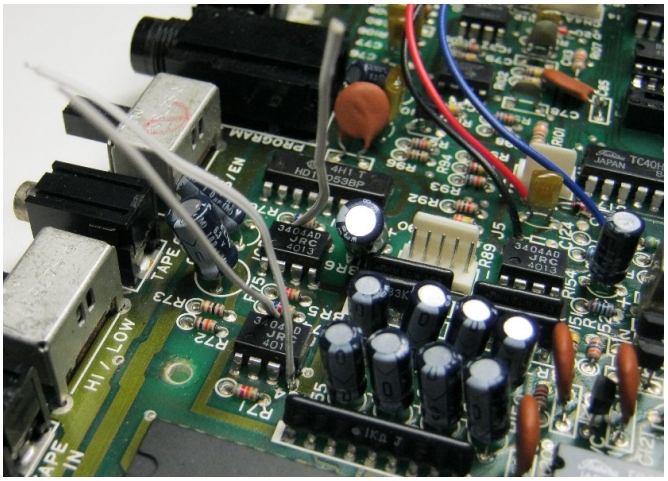
Step 9 - Attach 3 Hook Up Wires to the Main Board

We will now attach three wires to the main board. These three wires shall be installed before we install the AtomaHawk board into the synth.

- Attach three wires to the main board as shown in the table below.
- See the two (2) pictures below for additional detail on their locations and the pins and pads to which they connect.

Main Board IC	*Main Board Pin*	*Wire Length*
IC4	IC4 Pin 7	Two and a half (2 ½) inches
IC4	IC4 Pin 4	Two and a half (2 ½) inches
IC5	IC5 Pin 7	Three and a half (3 ½) inches

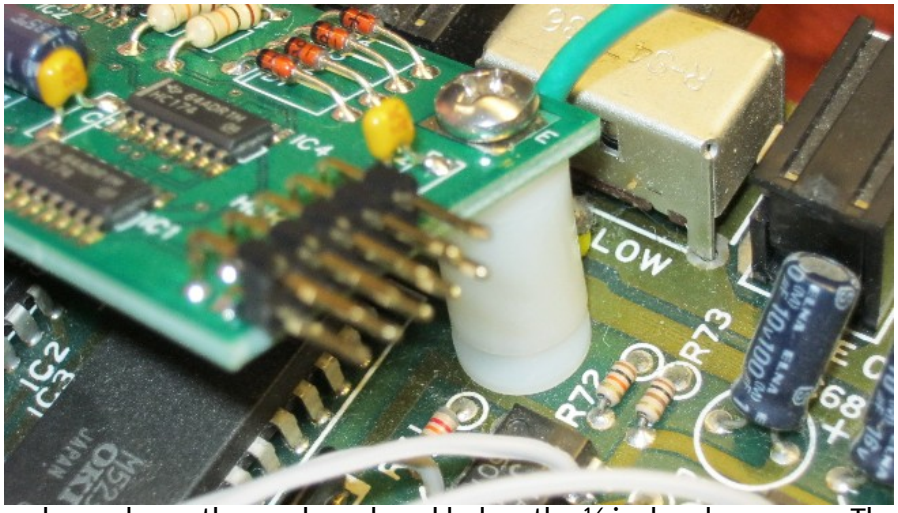




Step 10 - Install the AtomaHawk Board into the Poly-800, EX-800 or MK2

We will now install the AtomaHawk board on top of the main board.

- Install the AtomaHawk board using the half inch spacer and washer as shown below.
- For the electrolytic capacitors that are located beneath the AtomaHawk board, it will be necessary to carefully push the electrolytic capacitors over at an angle so that the AtomaHawk board does not interfere with them.
- See the two pictures below for detail.
- Use the supplied sheet metal screw for the Poly-800 and MK2. Use the M3 20mm long screw for the EX-800.



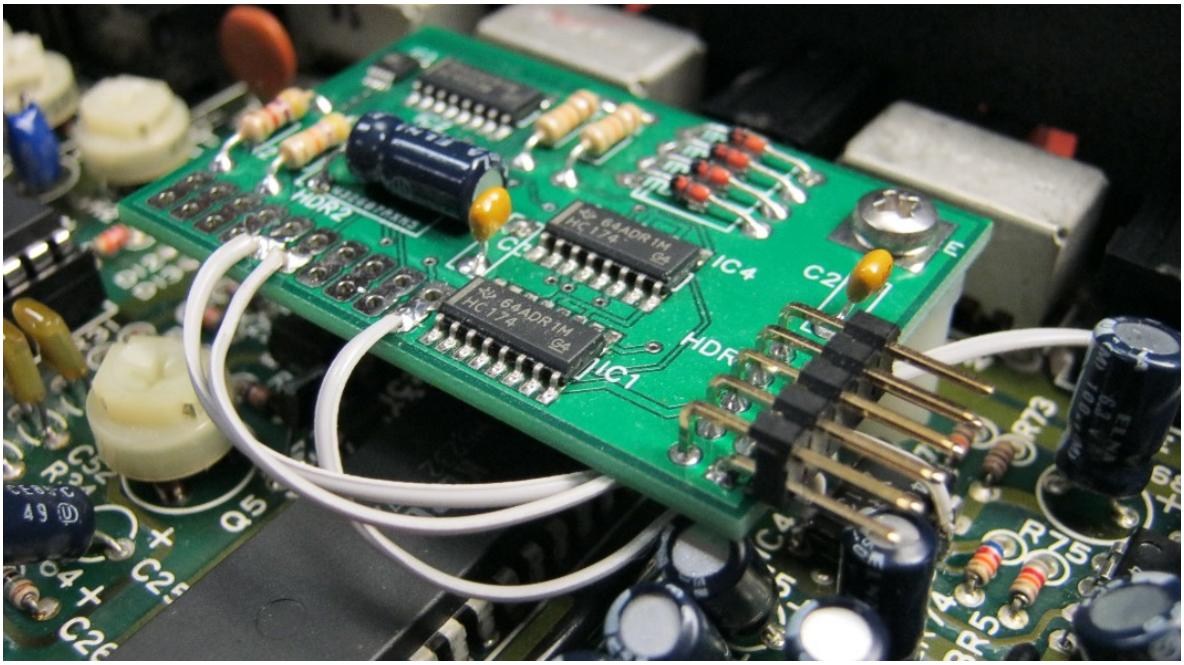
NOTE: The picture above shows the washer placed below the ½ inch nylon spacer. The board is shown at an angle for clarity. It will be horizontal when the screw is tightened.

Step 11 - Attach three wires to the AtomaHawk Board

We will now connect the three wires to the AtomaHawk board. See the table and picture below for details.

AtomaHawk	*Main Board IC*	*Main Board Pin*
Pad 5	IC5	Pin 7
Pad 6	IC4	Pin 7
Pad 10	IC4	Pin 4

The picture below shows the AtomaHawk board mounted in an EX800 with the first three hook up wires soldered onto the pads 5, 6 and 10.

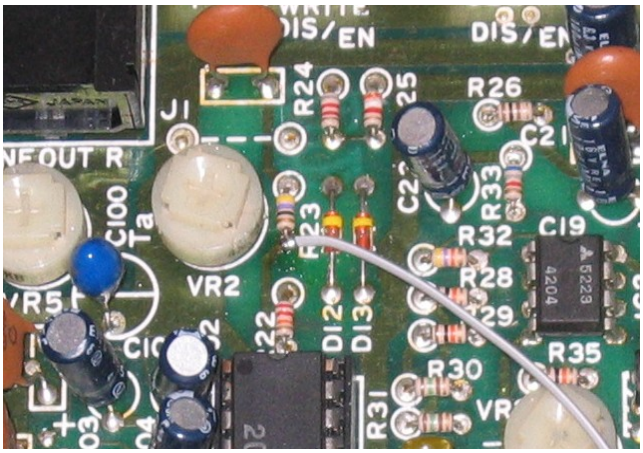


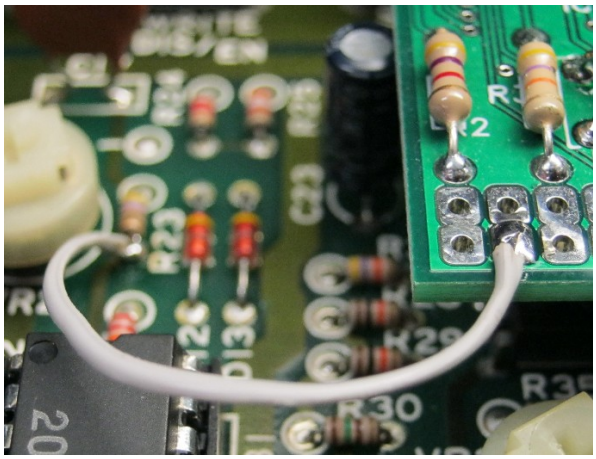
Step 12 - Attach R22-R23 wire to the AtomaHawk Board

Connect a patch wire two (2) inches in length from the R22-R23 junction on the main board to pin 2 on the AtomaHawk board. See the table and pictures below for details. Be very careful when soldering the wire to the R23 junction point as the resistor is very easy to damage and the point of soldering is very small. See the two pictures below for extra detail.

IMPORTANT: Solder pad pin 1 on the AtomaHawk board is NOT connected. Start at pad 2!

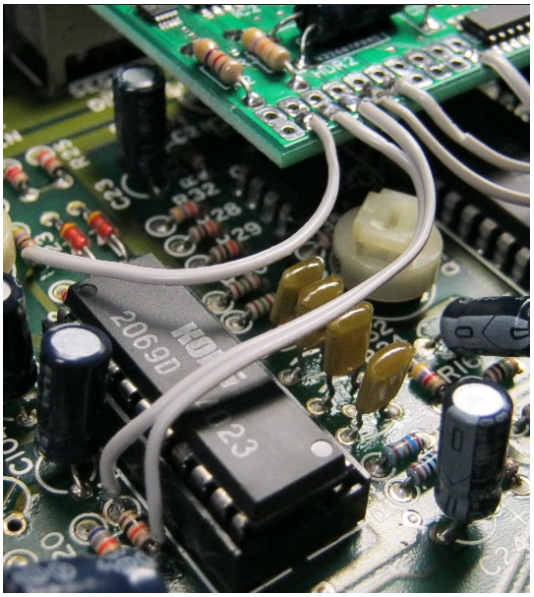
AtomaHawk	*Main Board Location*	*Main Board Position*
Pin 2	R23	Low side (see picture below)





Note that the jumper wire from R23 is connected on end closest to R22 (not R24) . See picture above left.

Step 13 - Attach Two Wires for Moog Slayer



Attach two wires two and half (2 ½) inches in length for the Moog Slayer extreme resonance modification. Use the table below and the picture at right for details.

NOTE: Do not separate these two wires. Keep the strands together to keep the wiring tidy as it passes over the NJM2069 filter chip.

- Attach two wires for extreme resonance as follows:

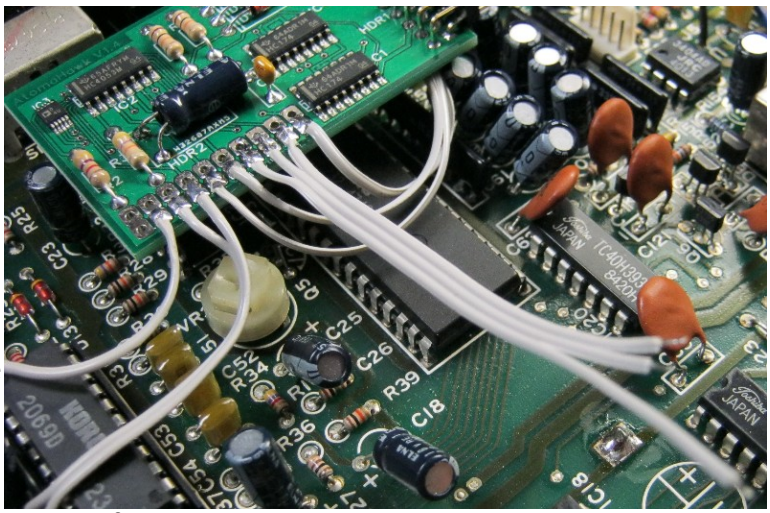
AtomaHawk	*Main Board Component*	*Main Board Location*
Pin 3	Resistor R21	Upper side of R21
Pin 4	Resistor R21	Low side (of R21

Step 14 - Attaching Three Wires for the 12/24db Filter Slope

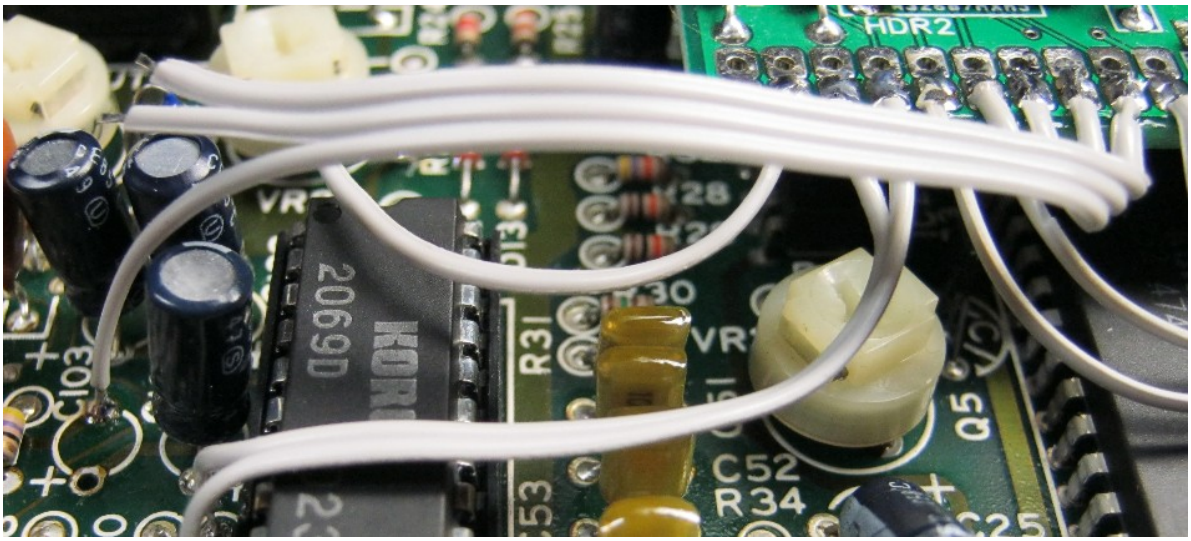
We will now attach the last three wires that are used for the 12/24dB filter slope modification.

- Attach three wires as shown in the table and pictures below. Do not separate the three wires. The three strands can be kept together.
- Note the length on one wire shall be three inches long while the other two wires shall be two and half (2 ½) inches long. See the picture below.

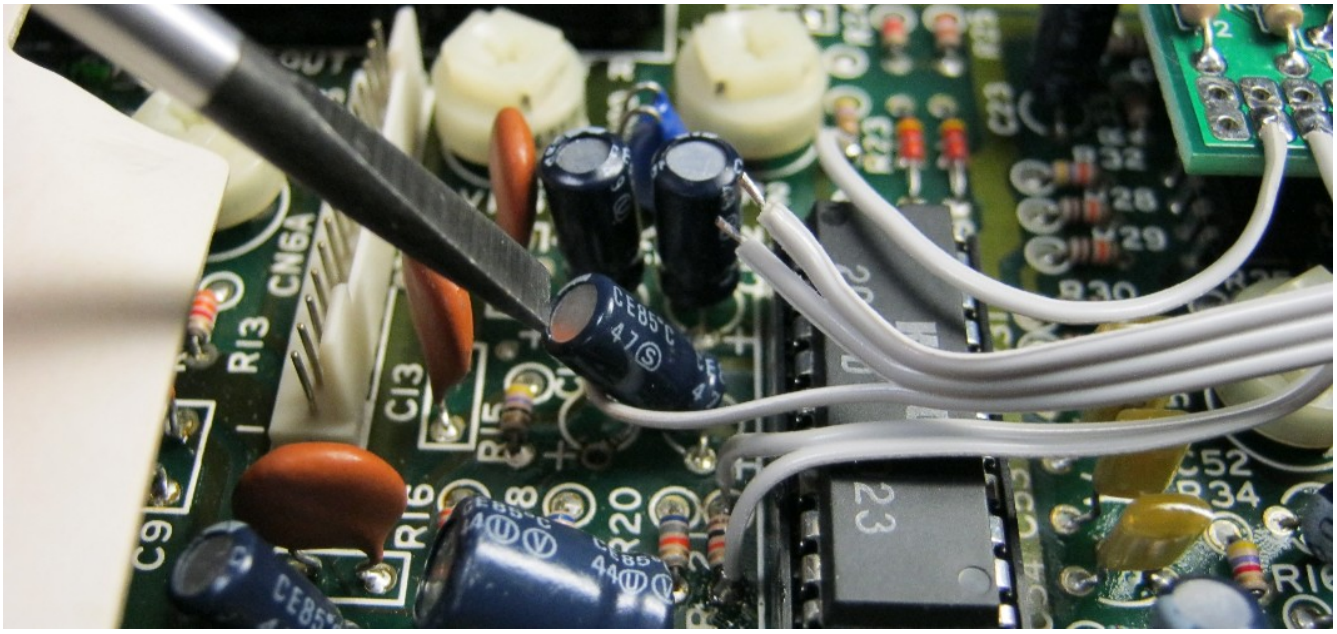
- Connect the three wires to the AtomaHawk first. See the picture shown at right that shows the long wire attached to pad 7 and the two short wires connected to pads 8 and 9.
- Now connect the long wire to the C103 connection. See the picture below that shows the C103 connection. Note how the three strands have been rolled over at the AtomaHawk board. And note that the C103 connection is made to the



negative side. The positive pad is left unconnected.

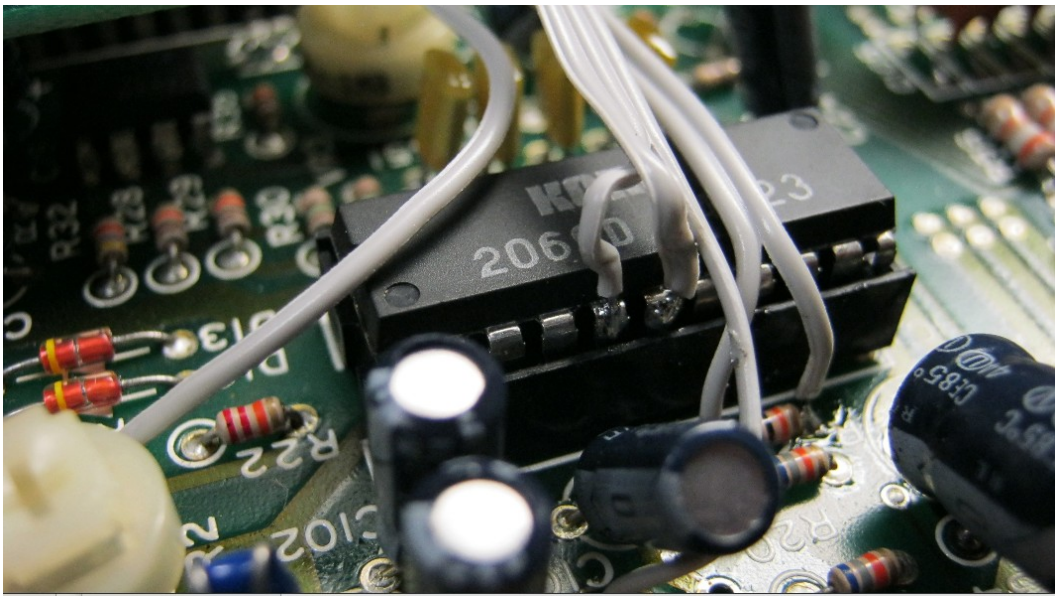


- IMPORTANT: Lean capacitor C104 over and route the C103 wire around it. This helps to keep NJM2069 pins 5 and 6 clear ready for soldering the two remaining wires to them.



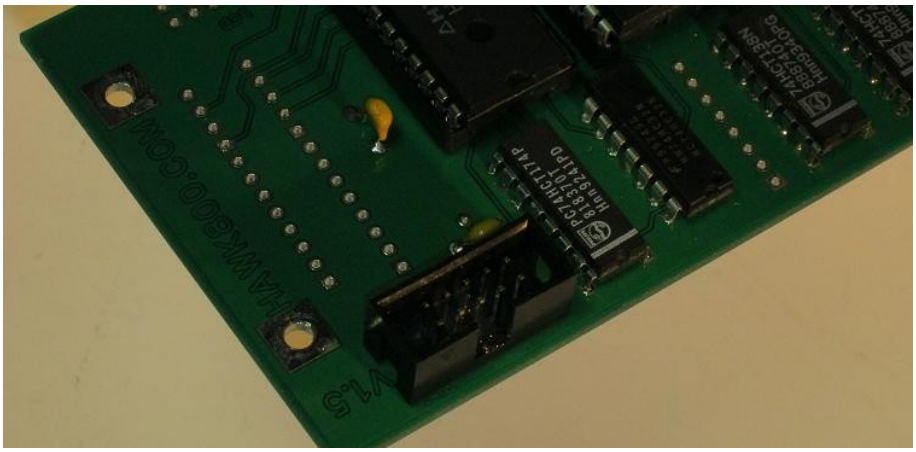
- Now attach the two wires to pins 5 and 6 on the NJM2069 chip. Note that the two remaining wires must twisted over so that pad 8 (the center wire) connects to pin 5 on the NJM2069. This leaves the wire attached to pad 9 to be soldered to pin 6 on the NJM2069.
- IMPORTANT: IC1 is installed in a socket. We recommend tinning the pins first (use solder sparingly) and attaching the hookup wires directly to the IC pins with the IC is installed in its socket. See pictures below for detail.
- IMPORTANT: pay careful attention to the picture below that show the pin 5 and pin 6 wires crossed over. In other words, note that pin 8 on the AtomaHawk connects to pin 5 on the NJM2069 and pin 9 on the AtomaHawk connects to pin 6 on the NMJ2069.

- IMPORTANT: Double check and then triple check that your wiring is correct!



AtomaHawk	*Main Board Component*	*Main Board Location*	*Length*
Pin 7	C103	High side C103 pad	Three (3) inches
Pin 8	IC1	Pin 5	Two and a half (2 ½) inches
Pin 9	IC1	Pin 6	Two and a half (2 ½) inches

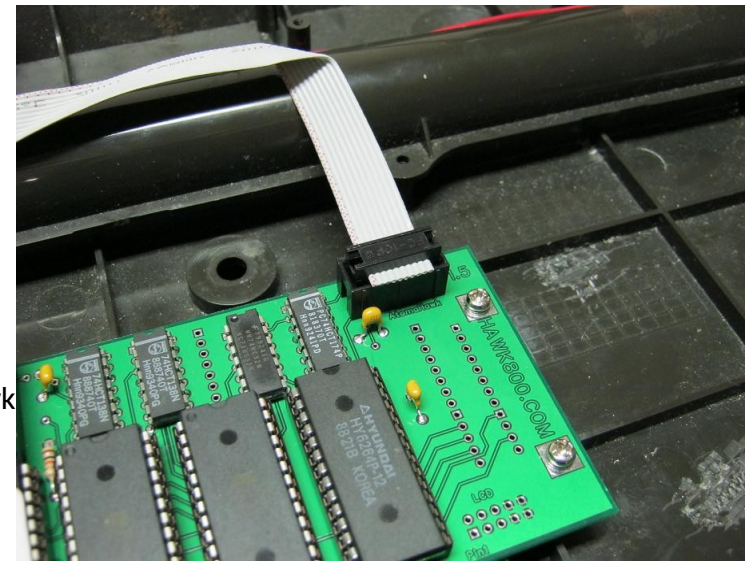
Step 15 - Install the HAWK Header Connector



Remove the HAWK board and install the AtomaHawk connector.

- Locate the 10 pin IDC male header connector and install it into the HAWK board.
- See the picture at right. Pay careful attention to the connector key slot which must be installed in the correct orientation. The connector must be installed so that the open key slot is closest to the edge of the HAWK board.
- Then reinstall the HAWK board and ribbon cables.

Step 16 - Install the AtomaHawk to HAWK Ribbon Header Cable

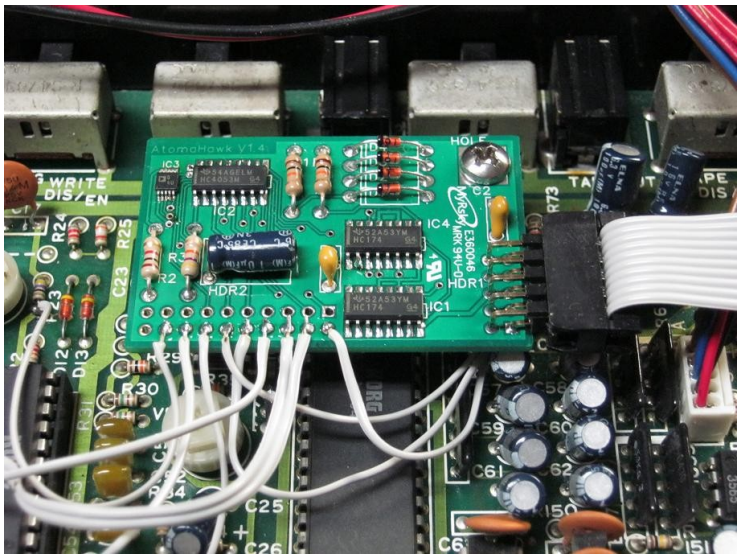


Locate the ribbon cable and connector assembly that was supplied with the AtomaHawk kit and install the cable. Use the pictures at right and below to assist with the installation.

- Install the ribbon header cable assembly as shown in the pictures at right and below.

NOTE: Notice in the picture of the AtomaHawk shown below that the key of the connector is facing down. The flat face of the connector is facing up (as seen in the picture).

Step 17 - Replace all Cable Assemblies, Close Up and Test



- Replace the two ribbon cable assemblies between the main board and the HAWK-800.
- Replace all of the cable assemblies between the upper and lower sections of your synthesizer and then close up the synthesizer.
- Solder the RFI shield connection back to the main board.
- Power on the synthesizer and test for correct operation.

Step 18 - Upload Software Version and Set Global Parameter 58

We now need to test that each modification feature works as it should.

First, download the latest version of software for the HAWK-800 (this version of the AtomaHawk requires version 2.65 or higher). This AtomaHawk kit will NOT operate correctly with HAWK-800 software below version 2.65. Go to www.hawk800.com and follow the links to the required software. Then, flash upgrade the software in your Poly. Make sure you follow the instructions for backing up sequencer and patch data before you upgrade the software.

IMPORTANT: **Set global parameter 58 to data value 1**. This enables the HAWK software to control AtomaHawk kit version 1.4. Setting 0 is for previous versions (below 1.4) of the AtomaHawk kit. If you do not set global parameter 58 to 1 then the HAWK will not be able to control the AtomaHawk.

Step 19 - Test the New Modifications

Test that each modification feature works as it should.

WARNING: Before testing the Moog Slayer modification, you should turn your speakers or head phones down low. The Moog Slayer is capable of producing loud resonant tones that could damage your equipment. Set the volume low first before testing the Moog Slayer.

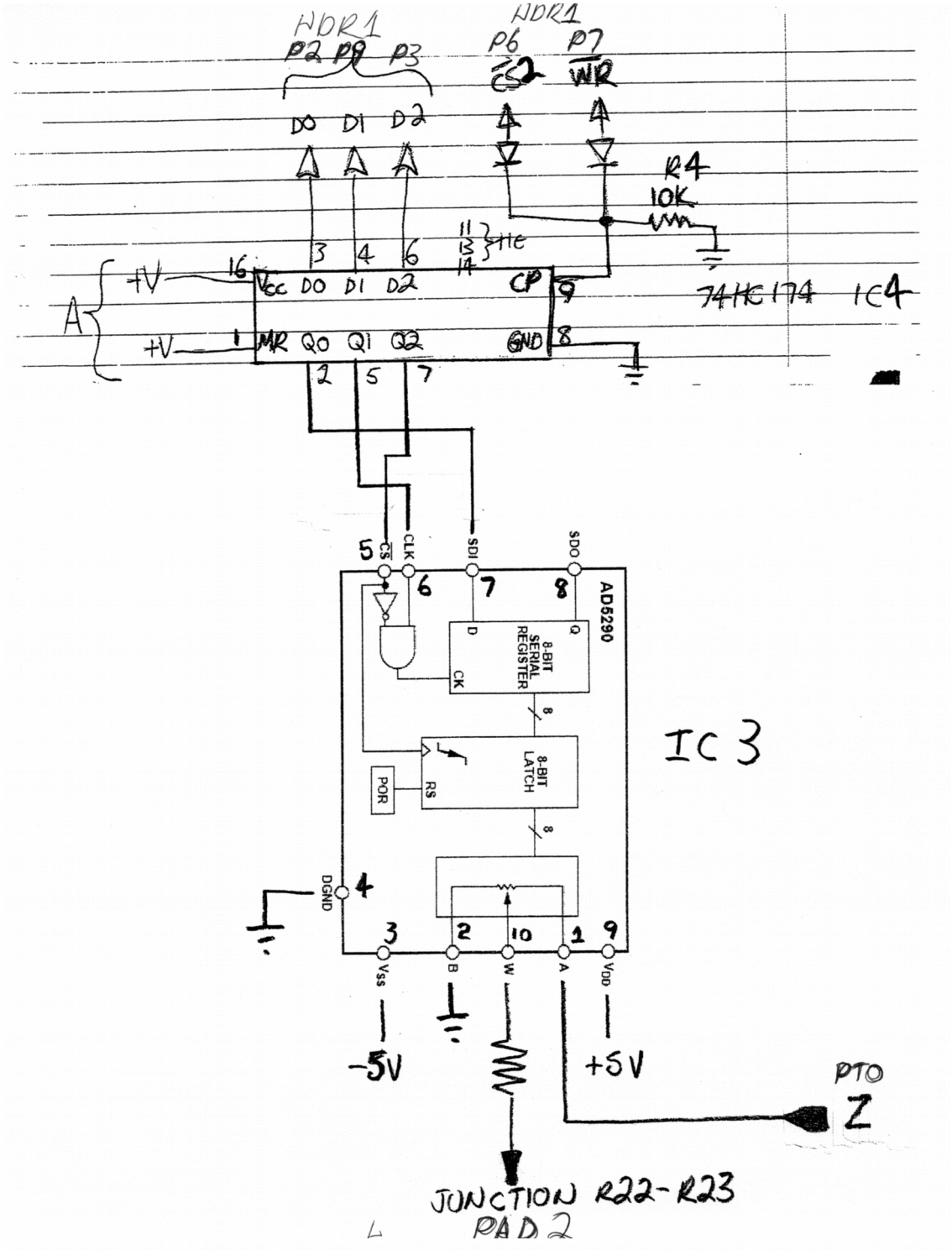
- You can check that the Moog Slayer (extreme resonance) modification operates correctly by setting extended parameter 58 to 1 and setting extended parameter 51 to 99. Setting extended parameter 58 to zero (0) turns the extreme resonance off, setting extended parameter 58 to one (1) turns Moog Slayer on.
- You can check that the FM-800 function operates correctly by setting extended parameter 61 to maximum (99) and press and hold at least 2 notes. The sound should be highly distorted while two notes are sounding. It may also be necessary to set parameter 68 to zero (0) to get the correct operation.
- You can check that the 12/24db per octave filter switch operates correctly by changing extended parameter 48 from 1 to 2 and back again. The filter slope should change between the two different filter slope modes.

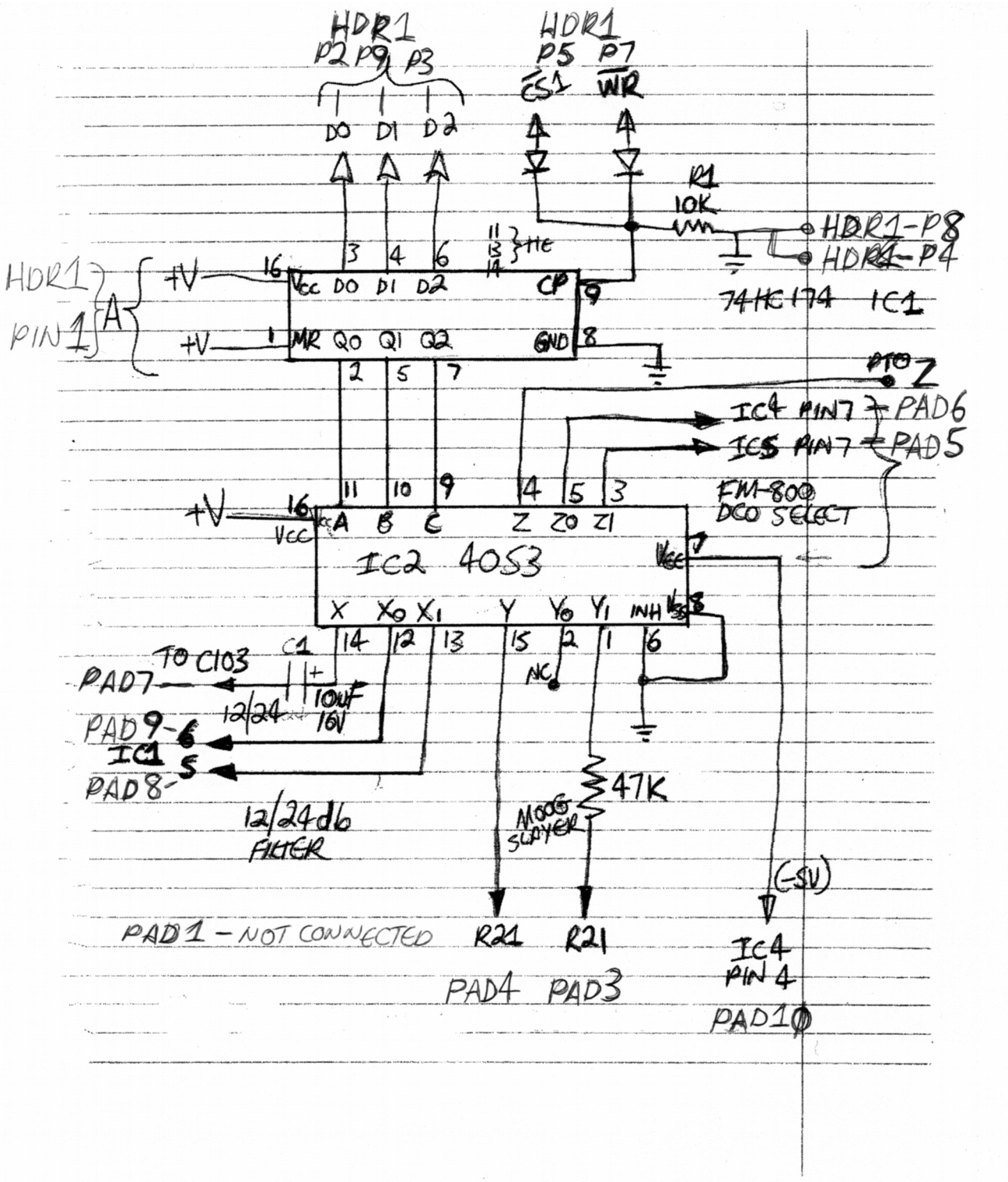
Getting Further Assistance

You can email support@hawk800.com to obtain assistance, answers to questions and for general inquiries.

Schematics

Hand drawn schematics of the AtomaHawk are provided for below.




HDR1
P2 P9 P3
D0 D1 D2
HDR1
P5 P7
CS1 WR
R1
10K
HDR1-P8
HDR1-P4
74HC174 IC1
HDR1 PIN 1
A
+V
Vcc DO D1 D2 CP
MR Q0 Q1 Q2 GND
PTO Z
IC4 PIN 7 = PAD6
IC5 PIN 7 = PAD5
FM-800 DCO SELECT
IC2 4053
A B C Z Z0 Z1
X X0 X1 Y Y0 Y1 INH
TO C103
C1
10uF 16V
12/24
PAD7
PAD9-6
IC1 5
PAD8-
12/24db FILTER
NC
47K
MOOG SLAVER
(-5V)
PAD1 - NOT CONNECTED
R21
R21
PAD4 PAD3
IC4 PIN 4
PAD10