# HAWK-800

# Construction and Installation Instructions

October 6<sup>th</sup>, 2018

This document is intended for the HAWK-800 kit version 1.5c.

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#### **Construction and Installation Instructions**

#### Introduction

#### IMPORTANT: Kit Versions 1.5, 1.5b and 1.5c

These instructions are for the HAWK-800P, HAWK-800MK2 and HAWK-800EX version 1.5, 1.5b and 1.5c. Version 1.5 kits began shipping in August 2011. These instructions also apply to the version 1.5b kit that began shipping in June 2012. And these instructions also apply to version 1.5c which began shipping in January 2018. Differences between the version 1.5, 1.5b and 1.5c boards are noted (with pictures) throughout the instructions. This kit is designed to be installed in the Korg Poly-800 (PS-800), the Poly-800 II (PS-800II) and the EX-800 synthe module.

#### **Congratulations!**

Congratulations on your purchase of the HAWK-800 retrofit kit. This kit provides your Poly 800, Poly-800 MK2 or EX-800 with many new and exciting sound creation and control capabilities. See <u>http://www.hawk800.com</u> for the latest list of completed and supported features as well as patches, templates and owners documentation.

#### 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 two components from the main Poly-800 (and MK2) or EX-800 printed circuit boards (PCB's). This requires advanced electronics technician skills. If you do not have the skills required to remove a 16 pin IC and a 28 pin DIP socket 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. The successful installation of this kit into the Poly-800 MK2 requires even more skilled work. Beware and consider yourself forewarned!

#### Special final WARNING!

You should NEVER attempt to install the AtomaHawk kit without first having installed and then successfully tested and operated your Poly-800 with ONLY the HAWK-800 kit installed. Do NOT attempt to install the HAWK-800 and the AtomaHawk in one installation session. Troubleshooting and repair of your Poly-800 becomes extremely difficult if not impossible if you attempt to install both kits in one installation session. Do NOT attempt it! We recommend that you install the HAWK-800 kit; wait until you have had a full 8 hours of continuous successful operation of your Poly-800 with the HAWK-800 kit installed; then follow up later with the installation of the AtomaHawk kit.

#### Safety First

NOTE: Exercise appropriate safety precautions at all times during construction and installation of this kit.

# **Before you Begin**

When you ordered your kit you would have specified either a Poly-800 MK1 kit (HAWK-800P) or an EX-800 kit (HAWK-800EX) or a Poly-800 MK2 kit (HAWK-800MK2). It is critically important to make sure that you obtained the correct kit, 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 and use the table below to make sure that the ribbon header cables that were shipped are correct for the kit that you ordered.

Kit	28 Pin Header Cable 16 Pin Header Cable	
HAWK-800P	8.5 inches	8.5 inches
HAWK-800EX	5 inches	5 inches
HAWK-800MK2	10 inches	10 inches

#### Preparation

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

- 1. Read through these instructions entirely so that you understand all of the required tasks and steps.
- 2. Check the kit for delivery of all components physically undamaged.
- 3. Obtain all of the needed tools and supplies.
- 4. Install all of the components onto the new HAWK-800 printed circuit board.
- 5. Modify and test the main board KLM-596 (KLM-1032 for the MK2).
- 6. Install the HAWK-800 board in your synthesizer.
- 7. Reinstall the original Korg boards and cables back into your synthesizer.
- 8. Upgrade the firmware in the synthesizer.
- 9. Test all functions in the upgraded synthesizer.
- 10. Begin using your upgraded synthesizer.

#### **Read the Instructions**

It is very important that you read all of the way through these instructions before beginning any work. This will give you a good understanding of the steps involved in the project. If you need assistance you can contact <a href="mailto:support@hawk800.com">support@hawk800.com</a> for additional explanation of any part of these instructions. This project requires patience and about 2 hours to complete (3 hours for the MK2). You should give yourself 4 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.

#### **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. Long point tweezers (or an IC removing tool).
- 6. Suitable Soldering iron (around 20/40 watts with fine soldering tip).
- 7. Vacuum de-soldering tool (Example: Radio Shack Model: 64-2098 Catalog #: 64-2098) or de-soldering bulb or de-soldering 'sucker' pump.

You will need to obtain the following supplies:

- 1. De-soldering braid (Example: Radio Shack Model: 64-2090 Catalog #: 64-2090.
- 2. Rosin core solder standard 60/40 formula for electronics work. Approx. 0.032" diameter.
- 3. When installing the HAWK-800 into an original Poly-800 (not the EX-800 or MK2 versions), it is necessary to obtain

your own printed circuit board stand offs. See the section "Mounting the kit in your synthesizer" for photos and recommendations on how to mount the kit in your synthesizer.

#### **Tape Features**

WARNING: The HAWK-800 upgrade kit supports loading and verifying tape patch and sequencer data from the original Korg Poly-800 and EX800. It does NOT support MK2 tape patch and sequencer data. The HAWK-800 MUST be running boot software version 2.0 or higher to support the tape load and verify features. All HAWK-800 kits shipped from July 2008 onward are provided with boot version 2.0 or higher. HAWK-800 kits obtained prior to July 2008 can have their boot code upgraded to version 2.0 or higher at which time, they will also be able to support tape load and verify. Tape dump features are NOT supported by the HAWK-800 software and there are no current plans to support tape save features.

#### Loss of MK2 Large Sequence Size Feature

WARNING: The only function of the Poly-800 MK2 that will cease to work after you install the HAWK-800 upgrade kit will be the large MK2 sequencer data size. The HAWK-800 upgrade kit supports the original Korg Poly-800 sequencer size of a maximum of 256 events. The HAWK-800 will not receive sequencer data from MK2 sysex bulk dumps. The Mk2 can receive sequencer data from the EX-800 bulk dump (that uses the smaller sequencer 256 event maximum). Keep in mind however, that the HAWK-800 upgrade improves the sequencer by providing 7 individual sequencer locations of 256 events each.

#### **Backup Patch and Sequencer Data**

WARNING: You WILL lose all of your patch and sequencer data during the installation process. You should backup your patches prior to starting the installation of the HAWK-800. Refer to the following table for methods available for saving and then restoring your patch library data.

Patch Library Backup and Restore Methods				
Poly-800 Model	Backup Method	Restore Method		
Poly-800 original 1 <sup>st</sup> method	Save patches to audio (using tape save feature).	Restore patches (using tape load feature).		
EX-800	Save patches using sysex dump or, Save patches to audio (using tape save feature).	Restore patches using the saved EX-800 sysex dumps or, restore patches (using tape load feature).		
Poly-800 MK2	Save patches using sysex dump.	Restore patches using sysex dump. Note that sequencer data from a MK2 sysex dump will NOT restore the sequence data because the HAWK-800 does not support MK2 large sequence data size.		

## Construction

### Assembling the HAWK-800 Board

#### Step 1 – Prepare a work space

First, you need to prepare a suitable workspace. Find a flat surface to work on such as a kitchen table or work bench. You will need a flat area about 1 meter square (3 feet x 3 feet). I recommend using a soft cloth laid over the surface in order to avoid scratching your synthesizer.

### Step 2 – Install all components into the HAWK-800 board

- Find the HAWK-800 printed circuit board and carefully inspect the board for damage, broken tracks. Use a multimeter to check that the bottom ground plane is not shorted to the top power plane (+5V). Contact technical support if you think you have identified any suspected problems with the board.
- Locate five (5) of the 28 pin IC sockets and one (1) of the 16 pin IC sockets.
- Also locate three (3) of the 74HC138, one of 74HC08, one of 74HC32 and one of 74HC174.
- **CAUTION**: For the following task, take extra care to ensure that you do not handle the logic chips by their pins. Hold each chip by the plastic ends to avoid touching the pins.
- Using the picture below as a guide, install the logic chips and the 16 pin socket. Take special care to ensure that the orientation of the chips is as shown in the picture. All notches and or pin 1 indentations are in the upper position in the picture. The notches are shown in the picture with a white "V".
- Using the picture below as a guide, install the five (5) of the 28 pin sockets. Notice that the notch for each 28 pin socket is also to be installed in the upper position. The notches are shown in the picture with a white "V".
- Take care to ensure that all pins for all chips and sockets protrude through to the back of the printed circuit board.



## Step 3 – Install the Capacitors and Resistors into the HAWK-800 Board

- Install the four capacitors and two 10K ohm resistors on the top side of the HAWK board. The location of the capacitors varies slightly with the different version of the HAWK-800 board. Version 1.5c boards have a top silk screen that clearly shows the locations of each of the resistors and capacitors.
- Use the picture below that corresponds to the board version that you have.
- The first picture applies to the version 1.5 board. "V1.5" is found in the upper right corner of the board.
- The second picture applies to the version 1.5b board. "V1.5b" is found in the bottom right hand corner of the board.
- The third picture applies to the version 1.5c board. "V1.5c" is found in the bottom right hand corner of the board.



Version 1.5 Board Discreet Component Location

Version 1.5b Board Discreet Component Location

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Version 1.5c Board Discreet Component Location



Note: Mk2 connectors are installed in this picture (lower right). If you are installing the HAWK-800 into a Poly-800 MK2 this picture helps to clarify the MK2 effects board connectors installation. The AtomaHawk connector is also shown (upper right).

# Step 4 – Install the Memory Chips

- **CAUTION**: For the following tasks, take extra care to ensure that you do not handle the memory chips by the pins. Hold each chip by the plastic ends to avoid touching the pins.
- Install the Boot ROM (which has a sticky label indicating the boot code version). Use the picture below to identify its correct installation location (second from the left).
- Install the 6264 static RAM chip in the far right position.
- Install the two (2) 28C256 flash memory chips in the remaining middle positions.



#### Modifying the Poly-800 Main Board

At this point, the real work begins to modify the Poly-800 main circuit board. So a word of caution, these tasks require patience and care. If you make any errors from this point forward, you could render your synthesizer permanently inoperable. That is, you could break your synthesizer and make it almost un-repairable. If you are unsure of your ability to carry out any of the tasks you should consider having the work done by a qualified electronics technician.

# Step 5a - Opening the Poly-800 or Poly-800 MK2

If you are installing the kit into an EX-800 then jump to step 5b.

- 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 5b – 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 6 - 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 7 – Remove IC 29 from the main board

Discussion: IC29 is a 74HC138 3 of 8 decoder logic chip that is used to decode the address lines for the microprocessor. This chip must be removed and replaced with a 16 pin DIP IC socket. This then allows a ribbon header cable to connect from this socket to the new HAWK board. We provide three 74HC138 chips in the kit and the IC29 chip is not needed for the HAWK to function. However, you should try to remove this chip intact so that testing can occur if the HAWK does not work on its first attempt. So, if you take enough care while removing this chip then the chip can be reused for testing if needed.

RECOMMENDED: We recommend using a professional vacuum de-soldering station to remove IC29 and the EPROM socket. Please use a professional vacuum de-soldering station if you have access to one.

NOTE: Do NOT over heat the chip and do NOT spend too much time with the solder braid. It is possible to overheat the glue that binds the copper tracks to the fiberglass board. You should spend no more than 10 seconds at a time with the soldering iron contacting each part of the board. Allow 20 seconds for the board to cool down each time you spend 10 seconds de-soldering.

- Warm up your soldering iron and allow it to achieve normal operating temperature.
- Locate IC29 and familiarize yourself with its position while looking at the front and back of the board (you don't want to remove the wrong chip see the picture below and use the chips around IC29 to get your reference).
- Use de-soldering braid and the vacuum de-soldering tool to remove as much solder as possible from the solder pads on the underside of the board.
- You may find that once you have removed most of the solder the chip still tends to stay stuck in place by tiny remaining amounts of solder. To free up each pin, carefully wiggle each pin in turn using the tip of the soldering iron just touching the very top of each IC leg. Eventually, by wiggling each leg while the solder is melted, the legs will become free.
- Once you can see that each leg is free, use your long point tweezers (or the flat bladed screwdriver) to gently lever the chip up from the surface of the PCB.



CAUTION: Use very little force while attempting to lever the chip from the board. If the chip will not move then most likely you still have some amount of solder holding the chip in place. If you use too much force, you will most likely rip up copper tracks off of the main board. This would be a disaster! Take your time. Don't rush it! See the picture above showing IC29 removed.

# Step 8 – Installing the IC29 16 pin DIP Socket

Now install a 16 pin DIP socket where IC29 (the 74HC138) once was. Use the picture below to determine the orientation of the socket. At one end of the socket is a notch that is used as a pointer to determine where pin 1 of each chip should be. You need to make sure that you get the orientation correct.

• Carefully insert a 16 pin DIP socket into the location of IC29. Ensure that the notch of the socket matches the notch shown on the board itself. See the pictures below.

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- Once you have carefully inserted the socket, check the back of the board to make sure that all 16 pins went through their respective holes. Also make sure that none of the pin sockets have pushed out of the socket. Do not start soldering until you have confirmed that all 16 pins went through the holes fully and correctly.
- Ensure that the socket is firmly seated then solder two diagonally opposite pins. Double check that the socket is seated completely and then solder all of the rest of the pins.

# Step 9A – Removing the IC22 EPROM socket

If you are installing the HAWK kit into a Poly-800 MK2 then go to step 9B. If you are installing the HAWK kit into a original Poly-800 or an EX-800 then the next step is to remove the IC22 EPROM socket. This is necessary because the existing socket uses very high side walls which make it impossible for a DIP header cable to securely plug in .

- Identify the IC22 EPROM socket.
- Remove the EPROM and store it so that you can reuse it if needed.
- Remove the socket. It is OK to damage or even destroy the socket since we do not need to reuse the socket. But exercise great care so that you do not damage the board itself or any of the tracks or through holes.
- Ensure that all 28 pin holes are cleared of solder so that you can proceed onto the next step.

### Step 9B – Remove main board connectors CN13A and CN14A

If you are installing the HAWK kit into a Poly-800 MK2 then the next step is to remove the two connectors that join the main board to the effects board. These two connectors are soldered into place on the main board where IC22 was found in the original and EX-800 versions.

- The connectors CN13A and CN14A must be removed from the MK2 main board (KLM-1032).
- WARNING: Be careful that you do not damage the CN13A or CN14A connectors because they both must be reused on the HAWK-800 board. Take care to remove the connectors without melting the plastic or damaging the pins. Take extra care to ensure that you do not damage any of the copper tracks on the printed circuit board.
- Once you have removed the connectors double check that all pins are present. Replace any pins that might have separated from the connector.
- Set the CN13A and CN14A connectors aside where you won't lose them.
- Now make sure that all 28 holes associated with the two connectors on the main board are completely clean of all solder since we need to install a 28 pin socket in this location.

# Step 10 – Installing the 28 pin DIP Socket

Now install a 28 pin DIP socket where the IC22 EPROM socket was just removed (for the MK2 where CN13A and CN14A were located and just removed). Use the picture below to determine the orientation of the socket. At one end of the socket is a notch that is used as a pointer to determine where pin 1 of each chip should be. You need to make sure that you get the orientation correct.

- Double check to make sure that all 28 holes are completely clear of solder so that the socket can be inserted without bending or rolling over any of the 28 pins.
- Carefully insert a 28 pin DIP socket into the location. Ensure that the notch of the socket matches the picture shown below.
- Once you have carefully inserted the socket, check the back of the board to make sure that all 28 pins went through their respective holes. Also make sure that none of the pin sockets have pushed out of the socket. Do not start soldering until you have confirmed that all 28 pins went through the holes correctly and that none of the pins have slightly pushed out of the socket itself.

• Ensure that the socket is firmly seated then solder two diagonally opposite pins. Double check that the socket is seated completely and then solder all of the rest of the pins. Make sure that you orient the socket correctly with the notch shown in the picture below.

#### Step 11 – Remove the lithium battery from the main board

If the main board has a lithium battery mounted on it then it needs to be removed.

• Remove the on board lithium battery. Use the picture below to identify a typical lithium battery installed in a Poly-800.

#### Step 12 – Install the "Write" Jumper

Discussion: At this point, we need to connect one small jumper wire onto the back of the main board in order to provide the new retrofit board with the CPU write memory control signal. The jumper connects pin 20 on the IC22 EPROM socket to IC21 static RAM 6116 pin 21. The picture below is of the back of a MK1 main board. Use the picture below to identify the precise pin locations of the jumper wire.

• Install the "write" jumper wire on the back of the main board.



#### Special Section for the Poly-800 MK2 (II)

### NOTE: Steps 13 through to 21 are for a MK2 installation only

If you are installing your HAWK kit into an original Poly-800 or an EX-800 you can skip forward to step 22. Follow steps 13 through 21 for a MK2 installation.

### Step 13 - Remove the effects board

• Locate the MK2 effects board (KLM-7798) and disconnect ALL cable assemblies and remove the mounting screws so that you can remove the effects board from the Poly-800 MK2. Set up the effects board in your work area.

### **Step 14 – Remove Three Chips from the Effects Board**

- Remove the EPROM chip (IC24) from the 28 pin socket on the effects board. Use a pair of tweezers or a small screwdriver to remove the chip. The ROM is not needed once the HAWK-800 is installed but you should store the EPROM in a safe place so that it can be used again if needed.
- De-solder and remove IC22 and IC23 from the effects board. Use the picture below as a guide.

![](_page_12_Picture_4.jpeg)

• Ensure that you clean up any loose solder from the effects board so that it is clean and thus, reliable.

# Step 15 – Install the Effects Board Jumper

- Now install a jumper onto the back of the effects board as shown in the picture below. Be particularly certain that you are connecting the jumper to the correct points as shown in the picture and ensure that the jumper reliably connects the two pins together (one of which is a through hole connection) and that the jumper wire does not short out to any other traces or pins on the board.
- This jumper is critical for the correct operation of the MK2 effects board. So if you later discover that your effects are not working as expected then double check this jumper location.

![](_page_13_Picture_1.jpeg)

# Step 16 – Reinstall the Effects board into the Poly-800 MK2 Synthesizer

- Reinstall the effects boards back into the MK2 synthesizer.
- Reinstall all board mounting screws and the ground shields etc.
- Ensure that you reconnect all cables excluding cable CN15.
- **IMPORTANT: DO NOT RECONNECT THE CN15 CABLE TO THE EFFECTS BOARD.** You may cut off (at the main board mounting posts) the five wires that connect to connector CN15. CN15 is the five pin connector that has five wires colored green, yellow, orange, red and brown. If you decide to leave the connector in place (not recommended) then ensure that you properly secure the cable but DO NOT plug it into the CN15 plug on the effects board.

# Step 17 – Install CN13A and CN14A Connectors in the HAWK-800 PCB

- Now locate the CN13A and CN14A connectors that were removed from the main board and install them (with the correct orientation) into the HAWK-800 board.
- Use the picture below as a guide for the proper orientation of the connectors. When you are certain that you have the orientation correct, solder them in place making sure that all pins are fully inserted and that the plastic connectors are fully seated onto the board.

![](_page_14_Picture_1.jpeg)

IMPORTANT: See page 7 for a picture showing the MK2 effects board connectors installed into board version 1.5c.

# Step 18 - Install the Main Board back into the MK2 Synthesizer

- Reinstall the MK2 main board (KLM-1032). Do NOT install the KLM-601 board at this time.
- Reinstall all main board mounting screws and the ground shields etc.
- Ensure that you reconnect all cables to the main board (obviously you can no longer connect CN13A and CN14A cables to the main board because the plugs are now installed in the HAWK-800 board).

# Step 19 - Install the KLM-601 and HAWK board into the MK2 Synthesizer

- The KLM-601 board and HAWK board are installed in a specific "stacked" way. See the pictures below that show the KLM-601 board mounted face down (the opposite to its original mounting method) and the HAWK board mounted above it.
- First, mount the KLM-601 board face down (trimmer pots down) and install only the top right hand screw. See the picture below.

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![](_page_15_Picture_1.jpeg)

• Next, locate the four ¼ inch nylon spacers supplied with the HAWK kit and place them in position as shown in the picture below.

![](_page_15_Picture_3.jpeg)

- Next, locate the four screws supplied with the HAWK kit.
- Place the HAWK board into position over the nylon spacers and affix the screws in order to mount the board in position. See the picture below.

![](_page_16_Picture_1.jpeg)

NOTE: The KLM-601 board is now safely located under the HAWK board. If any future adjustment is needed to the trim pots on the KLM-601 board then the HAWK must be removed. Then the KLM-601 board must also be removed to allow trim pot adjustment. Then, when the adjustments are completed the two boards must be replaced as discussed and shown above.

# Step 20 – Install CN13, CN14 Cables

- Install the CN13 and CN14 cables from the effects board to the HAWK-800 board. Connecting both ends of each cable requires matching the plastic keys with the connectors.
- Pay special attention to the orientation of the CN13 and CN14 cables. On the HAWK board, both CN13 pin 1 and CN14 pin 1 are at top while on the effects board pin 1 is at bottom for both connectors.

![](_page_17_Picture_1.jpeg)

# Step 21 – Install the 28 pin and 16 pin header cables

- Locate and install the 28 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.
- Locate and install the 16 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.

![](_page_18_Picture_1.jpeg)

• You should now move on to step 26.

### Special Section for the Poly-800 (original version)

# NOTE: Steps 22 through to step 25 are for an original Poly-800 HAWK installation only

#### Step 22 - Install the Main Board back into the original Poly-800 Synthesizer

- Reinstall the original main board (KLM-596).
- Reinstall all main board mounting screws and the ground shields etc.
- Ensure that you reconnect all cables to the main board.

### Step 23 - Install the KLM-601 board into the original Poly-800 Synthesizer

• Reinstall the KLM-601 board using the two original screws.

## Step 24 - Mounting the HAWK board in an original Poly 800

- Attach four printed circuit board standoffs (not supplied) to the printed circuit board with four screws (not supplied). We used standoffs 1/4 inch high with tapped brass inserts.
- Using a suitable non damaging cleaner, thoroughly clean the area in the Poly 800 case where the board is to be mounted.
- Using either a hot melt glue gun or another suitable epoxy or silicon based glue, attach the board to the case.
- Take care that you position the board so that it will not interfere with the metal case mounting brackets and screws (see the picture below). Line up the top edge of the HAWK-800 board with the plastic rib that runs horizontally and align the left and right with the ribs as shown in the picture.
- Allow plenty of time for the glue to dry/cure before attempting to unscrew the mounting screws. You shouldn't actually have to remove the board unless it doesn't work for some reason.

![](_page_19_Picture_7.jpeg)

# Step 25 – Install the 28 pin and 16 pin header cables

• Locate and install the 28 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure

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that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.

• Locate and install the 16 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.

![](_page_20_Picture_3.jpeg)

• You should now move on to step 30.

#### Special Section for the EX-800 Synthe Module

# NOTE: Steps 26 through to step 29 are for an EX-800 HAWK installation only

#### Step 26 - Install the Main Board back into the EX-800 Synthesizer

- Reinstall the original main board (KLM-596).
- Reinstall all main board mounting screws and the ground shields etc.
- Ensure that you reconnect all cables to the main board.

### Step 27 - Install the KLM-601 board into the EX-800 Synthesizer

• Reinstall the KLM-601 board by using the upper left hand screw only. See the picture below.

![](_page_21_Picture_3.jpeg)

### Step 28 - Mounting the HAWK board in an EX800.

Mount the HAWK board into the EX-800. Use the picture above as a guide.

- The HAWK board is mounted on top of the KLM-601 board in a "stacked" method.
- Locate the nylon spacer and nylon washer supplied with the HAWK kit.
- Locate the 3mm metric screw supplied with the HAWK kit.
- Mount the HAWK board using the below right hand screw mounting point that will secure both the KLM-601 and the HAWK board.
- Ensure that the HAWK board is mounted so that it allows the proper insertion of the 16 pin header into the IC29 socket. See the picture below.

#### HAWK-800 Constructions and Installations Instructions - https://www.hawk800.com

![](_page_22_Picture_1.jpeg)

# Step 29 - Attach the Ribbon Cables in the EX-800

- Locate and install the 28 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.
- Locate and install the 16 pin header cable assembly. Be careful to ensure that the pins are lined up correctly with the sockets because it is very easy to incorrectly align the plugs in these sockets. Also take great care to ensure that you do not bend over any of the pins as you insert the plugs into the sockets. See the picture below.

![](_page_23_Picture_1.jpeg)

# Testing

## Step 30 - Initial Integrity Test

The big moment has arrived where we see the instrument working with its new HAWK upgrade in place. But before we do anything more, we need to carry out an initial integrity test to make sure that the new board was constructed and installed correctly.

- Make sure your synthesizer is switched off.
- Plug in the power pack.

If all goes well the synthesizer should power up and will initially flash "88 88 88" followed by "HA-800" for several seconds before then moving through some error messages.

If you don't see anything on the display at all then you need to go back and check all of your work again.

If you DO see flashing "88 88 88" followed by "HA-800" then most likely your HAWK installation is working.

- Turn off your synthesizer.
- Close up the synthesizer and re-install all of the case screws.
- Clean up your work area and put away your tools.

NOTE: It is normal to see error messages "Error 4", "Error 5" and "Error 6" when you install the HAWK-800. Those three messages indicate that the HAWK does not have working flash software loaded into the software flash ROM. If you see any other error messages (Error 0, Error 1 or Error 3) then you have a problem with your HAWK installation. Check your work thoroughly, especially the soldering on the HAWK board itself. Also check the soldering of the EPROM socket and IC29 socket. Also check that the ribbon cables are installed correctly and no pins are bent over or broken. See the owners manual (pages 35-37) for the list of power on self tests and what they mean. Also see the addendum on troubleshooting the installation (see below for the addendum on troubleshooting).

## Step 31 - Installing the Flash Software into your HAWK-800

At this point you most likely have successfully completed all of the hardware upgrade work and you are now ready to upgrade the software in the flash memory of the HAWK-800. The synthesizer will not operate until you have successfully installed the latest software into the software flash memory.

**WARNING: DO NOT install BOOT software!** The HAWK kit always ships out with the most recent BOOT software. So there is no need to install the BOOT software. You ONLY need to install the flash software. At this stage, if you have problems with the HAWK not booting up or not flashing the software DO NOT try to install boot software. Doing so will only make any problems worse.

You must install flash software immediately after installing the HAWK kit into your Korg Poly-800 or EX-800. If you have successfully installed the HAWK kit, when you power on the synth it will display flashing 88 88 88, then HA-800, then ERROR 4, ERROR 5 ERROR 6. And it will keep repeating this endlessly. It does this because you have not yet installed the HAWK software into the flash software memory. If you do not see flashing 88 88 88 when you power on then do not proceed any further. Your kit is most likely not operating correctly. See the troubleshooting section below.

To install the software into your HAWK, follow the instructions below:

**Step 1** - Download and unzip the latest flash software SYSEX files from:

https://sourceforge.net/projects/hawk800/files/Software/. Make sure that you have the files: EEPROM0.SYX,

EEPROM1.SYX and EEPROM2.SYX saved onto the computer from where you will be sending the SYSEX.

**Step 2** - Connect MIDI OUT from your computer to MIDI IN on your Poly-800. Make sure you don't have any MIDI loops. Make sure your computer is not sending any MIDI except for the SYSEX file. MIDI-OX is commonly used on Windows OS PC's.

Step 3 - Power on your Poly-800 and press and hold down the "Write" button. The display will change to "FLASH".

**Step 4** - Use MIDI to send "EEPROMO.SYX" to your Poly-800. The Poly-800 display should change to "FLASH 1" then "FLASH 4" then "FLASH 5" and then should stop at "Good 0". Press the "Write" button to return the display to "FLASH".

**Step 5** - Use MIDI to send "EEPROM1.SYX" to your Poly-800. The Poly-800 display should change to "FLASH 2" then "FLASH 4" then "FLASH 5" and then should stop at "Good 1". Press the "Write" button to return the display to "FLASH".

**Step 6** - Use MIDI to send "EEPROM2.SYX" to your Poly-800. The Poly-800 display change to "FLASH 3" then "FLASH 4" then "FLASH 5" and then should stop at "Good 2".

**Step 7** - Press the "Prog/Para" button to restart your Poly-800. If all goes well, then your Poly-800 should display flashing 88 88 followed by HA-800 and should stop at "11 P".

**Step 8** - IMPORTANT: You must set global parameter 34 to the type of Poly that you have (Poly-800, EX-800 or MKII). **Step 9** - IMPORTANT: You must set global parameter 58 to the correct AtomaHawk version. See the Owners Manual for details.

**Step 10** – Upload or create new patches in your new HAWK. See the owners manual for instructions on uploading a new patch set. You can obtain example patch sets from: <u>https://sourceforge.net/projects/hawk800/files/Patch%20Library/</u>

**IMPORTANT:** If your synth displays ERROR 1 then there was an error in the transmission of the SYSEX message to the HAWK synth. Check your MIDI setup. Especially look out for cheap USB MIDI interfaces that do not conform to MIDI electrical spec's. Check for MIDI loops and make sure that no MIDI messages are being sent to the synth while the SYSEX file transmission is underway.

# Addendums

#### HAWK-800 Kit Mounting Hardware for the PS-800

HAWK-800 kits that are for the PS-800 (original Poly-800) that are shipped out after July 2018 are provided with four mounting posts, screws and washers. These are for use in mounting the HAWK board into the Poly-800. We have not yet provided detailed instructions for their best installation. Contact <a href="mailto:support@hawk800.com">support@hawk800.com</a> for details.

### Troubleshooting the HAWK-800 Kit Installation

So you have installed the HAWK-800 and plugged everything in and tried to power on but all you got was random characters on the display or perhaps a completely blank display with no sound, not any sign of life at all. Well, you need to go through the following steps one at a time.

#### **Power Supply Check**

- 1. Check that the power supply adapter is rated 9V DC and the current rating is 500mA or higher.
- 2. Check that the +5V supply on the main board is precisely +5 volts. Be extremely careful when checking the +5V rail. Do NOT short out any component pins. You can check the voltage easiest on the HAWK board. See the picture below. Set your multimeter to DC 10V measurement setting and then check for exactly 5 volts measured across the capacitor in the top right hand position. You will need to open your synth up, carefully lay to the two halves down so that all cables remain connected. Then power on the synth and carefully measure the +5V rail. NOTE: the picture shows the AtomaHawk connector installed on the HAWK board. Most likely, your HAWK should NOT have that installed as yet.

![](_page_25_Picture_9.jpeg)

### **Check Component Location and Orientation**

Check that you installed all of the components into the HAWK board in their correct locations and correctly oriented.

# **Check Ribbon Cables**

Check that there are broken or bent over pins on the two ribbon cable assemblies. Check both ends of both cables. Then check that you install them correctly. Sometimes people misalign the cables by one or two rows. Make sure they are installed as shown in the pictures in the instructions.

### Is Your Soldering Good?

Maybe you have 'some' soldering experience but don't actually have good knowledge of how to solder. Don't be embarrassed about that. Good soldering is both a skill and an art. If you are not sure if your soldering is good, send a picture of the back of your HAWK board to <a href="mailto:support@hawk800.com">support@hawk800.com</a> and we can tell you if it looks good or not. If you are not sure about your soldering skills check out this youtube video and watch and learn. <a href="https://www.youtube.com/watch?">https://www.youtube.com/watch?</a> <a href="mailto:y=fY25nIHH0iy">y=fY25nIHH0iY</a> If you were not soldering properly, you can redo the soldering. But again, what the youtube and learn about the right way to solder, how much solder to use, how to heat the joint first. And how to redo a bad joint.

### **Check All Soldering for Bridges or Missed Joints**

Now, check for:

- 1. Un-soldered pins. Pins that were not soldered at all.
  - a) Check every solder point on the HAWK board.
  - b) Check each pin for the IC29 socket on the main board.
  - c) Check each pin for the EPROM socket.
  - d) For the MK2, check all of the connections related to the MK2 installation.
- 2. Bridged pins. Where you joined two or more pins together when they should not be.
  - a) Check every solder point on the HAWK board.
  - b) Check each pin for the IC29 socket on the main board.
  - c) Check each pin for the EPROM socket.
  - d) For the MK2, check all of the connections related to the MK2 installation.

If none of the above helps to bring your Poly/HAWK alive then proceed to the next stage.

#### **Main Board Checks**

Using a multimeter and with the power unplugged from your synth, on the main board, check the following:

#### **IC29 Socket**

IC 29 socket between pins 16 and 6 should show zero ohms (shorted).

IC 29 socket between pins 16 and 6 should both show shorted to pin 28 on the IC 22 socket.

IC 29 socket between pins 4, 5 and 8 should show shorted.

IC 29 socket between pins 4,5 and 8 should also all show shorted to pin 14 on the IC22 socket.

There should **NOT** be any shorts between IC29 pins 1, 2, 3, 7, 9, 10, 11, 12, 13, 14 and 15. Your ohm-meter might show some resistance but it should NOT show a zero ohms short.

IC29 socket pin 1 should show a short with IC24 pin 26.

- IC29 socket pin 2 should show a short with IC24 pin 27.
- IC29 socket pin 3 should show a short with IC24 pin 28.

IC29 socket pin 7 should show a short with IC26 pin 9.

IC29 socket pin 9 should show a short with IC16 pin 4

IC29 socket pin 10 should show a short with IC16 pin 9.

IC29 socket pin 11 should show a short with IC34 pin 4.

IC29 socket pin 12 should show a short with IC16 pin 12.

IC29 socket pin 13 should show a short with IC25 pin 8.

IC29 socket pin 14 should show a short with DTC2 pin E (emitter). It's difficult to figure out which pin is the emitter so just test all three pins on DTC2 until you get a zero ohms reading on one of the three.

IC29 socket pin 15 should show a short with IC22 socket pin 20.

### **IC22 Socket**

IC22 socket between pins 1, 26, 27 and 28 should show a short. IC22 socket pin 28 should show a short to Vcc on IC24 pin 40). IC22 socket pin 14 should show a short to Ground on IC24 pin 20.

There should **NOT** be shorts between any of the other IC22 socket pins 2 to 13 and 15 to 25. Your ohm-meter might show some resistance between those pins but the meter should NOT show a zero ohms short between any of them. It is most important to check that neighboring pins are not shorted since neighboring pins are most likely to become an electrical short due to a solder bridge being formed when the socket was installed and soldered in. Work your way from pin 2 all the way down to pin 13, moving your probes from each pair of neighboring pins to the next always looking for a zero ohm short. Then work your way back up from pin 15 all the way up to 25 in the same manner.

IC22 socket pin 2 should show a short to IC24 pin 25. IC22 socket pin 23 should show a short to IC24 pin 24. IC22 socket pin 21 should show a short to IC24 pin 23. IC22 socket pin 24 should show a short to IC24 pin 22. IC22 socket pin 25 should show a short to IC24 pin 21.

IC22 socket pin 10 should show a short to IC23 pin 2. IC22 socket pin 9 should show a short to IC23 pin 19. IC22 socket pin 8 should show a short to IC23 pin 5. IC22 socket pin 7 should show a short to IC23 pin 16. IC22 socket pin 6 should show a short to IC23 pin 6. IC22 socket pin 5 should show a short to IC23 pin 15. IC22 socket pin 4 should show a short to IC23 pin 9. IC22 socket pin 3 should show a short to IC23 pin 12.

IC22 socket pin 11 should show a short to IC24 pin 12. IC22 socket pin 12 should show a short to IC24 pin 13. IC22 socket pin 13 should show a short to IC24 pin 14.

IC22 socket pin 15 should show a short to IC24 pin 15. IC22 socket pin 16 should show a short to IC24 pin 16. IC22 socket pin 17 should show a short to IC24 pin 17. IC22 socket pin 18 should show a short to IC24 pin 18. IC22 socket pin 19 should show a short to IC24 pin 19.

# Still No Good?

If you still do not see flashing 88 88 88 when you power on your synth then contact <a href="mailto:support@hawk800.com">support@hawk800.com</a> for more assistance.

# ROM chip positions

The picture below shows the four 28 pin chip locations marked A through D.

- A is the boot ROM. The boot ROM may be delivered in the kit with a label on the front or is marked in black marker on the back of the chip with the letter "B" (indicating boot ROM). This is a 28C256 32Kx8 EEPROM.
- B is the software ROM. Three software image files must be sent ("flashed") to the HAWK-800 in order to fill the software flash ROM with the required software. This is a 28C256 32Kx8 EEPROM
- C is the patch data storage ROM. This is a 28C256 32Kx8 EEPROM
- D is the random access memory (RAM) chip that stores temporary data used for proper synthesizer operation. This is a 6264 type (or equivalent) 8K x 8 static RAM.

![](_page_28_Picture_1.jpeg)

#### **Reverting Back to Original Operation**

NOTE: The procedure below only applies to the original Poly-800 (PS-800) and the EX-800. The procedure for reverting the MK2 (PS-800II) is <u>not</u> included here. If you need assistance with a MK2, contact <u>support@hawk800.com</u>.

If it is necessary to revert your Poly-800 or EX-800 synth back to original operation then follow the instructions below:

- 1. Power off your synthesizer and disconnect the power. Then open up the synth.
- 2. Remove all of the HAWK components.
- 3. Unscrew and remove the main board and then remove the "Write" jumper from the back of the main board.
- 4. Replace IC29 (40HC138/74HC138). You can use the original IC29 or use one from the HAWK board.
- 5. Replace the original EPROM into the EPROM socket.
- 6. Close up your synthesizer and test it.

HAWK800 website: http://www.hawk800.com

HAWK800 sourceforge site: <u>https://sourceforge.net/p/hawk800/</u>

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