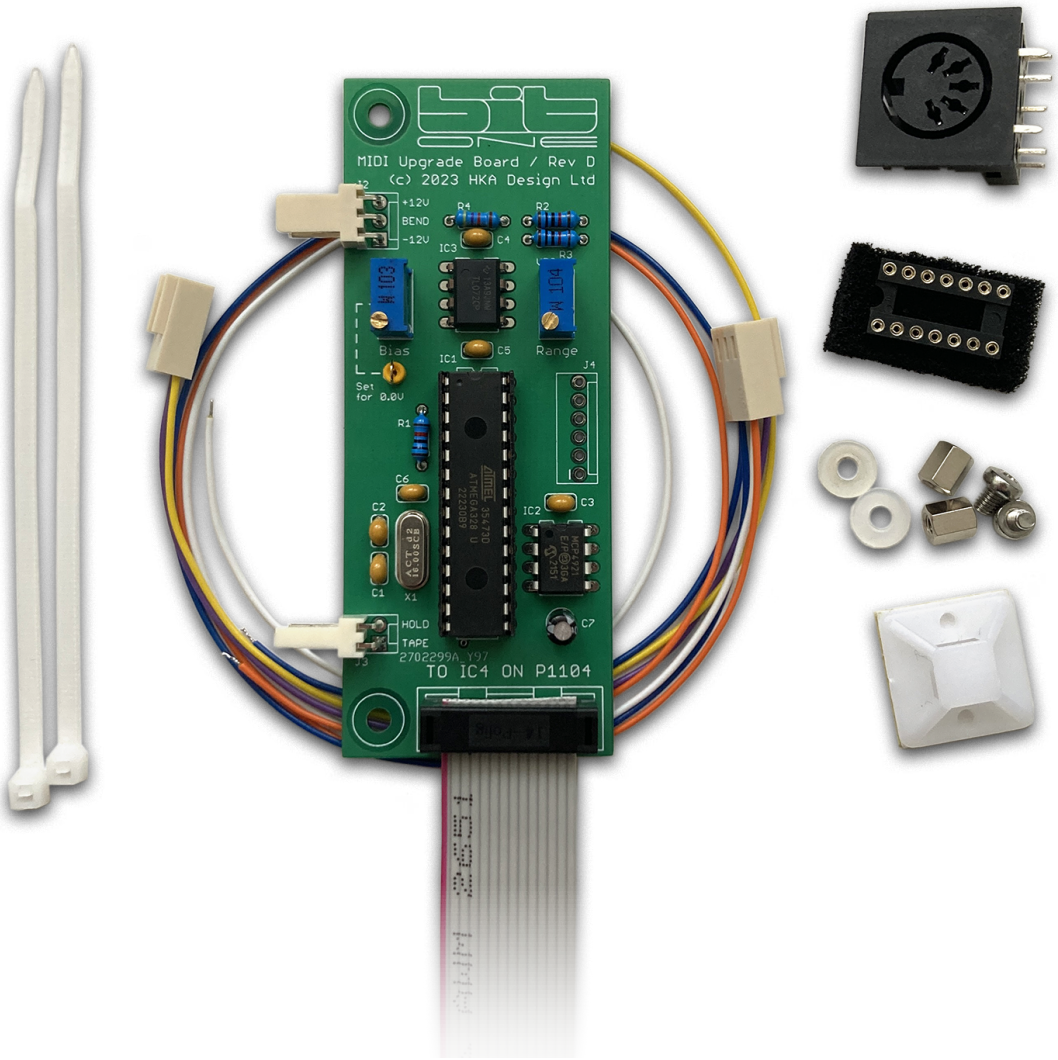
hka design



Bit One MIDI Upgrade

Board Rev. D
Installation / User Instructions

This kit includes:

1x	Pre-assembled PCB with ribbon cable
1x	14-way IC socket
1x	5-way DIN socket
1x	3-way cable
1x	2-way cable
2x	M3 x 6mm hex standoffs
2x	M3 x 4mm machine screws
2x	M3 x 1mm nylon washers
2x	Cable ties
1x	Self-adhesive cable tie base

You will need:

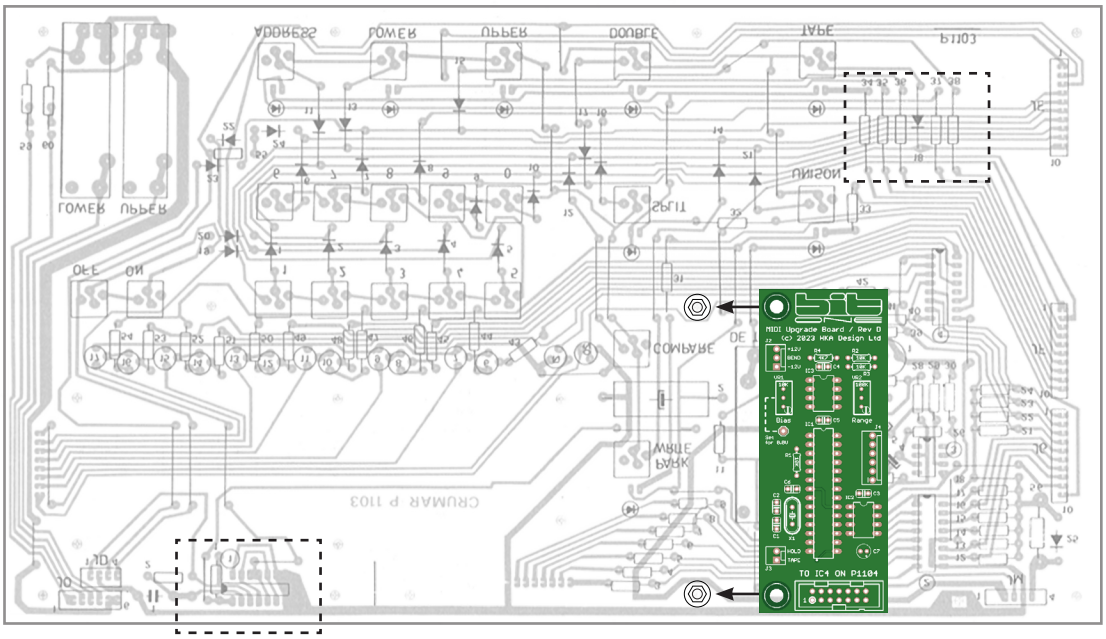
- Soldering iron & lead solder
- Desoldering pump or solder wick
- Phillips head screwdriver
- Small flat head screwdriver
- Digital multimeter

Installation

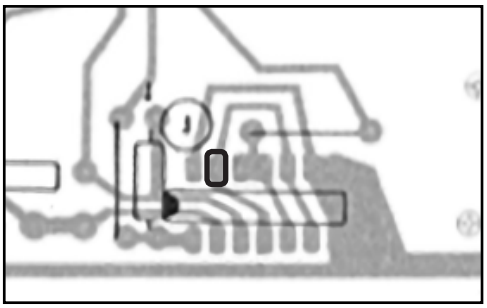
1. **Unplug the power cable from the synthesizer.** Hinge up the lid by removing the 3x screws on the top and 2x upper screws on each side panel.

2. Remove the M3 nuts from the 2x locations on the panel board (P1103) shown below, leaving the original plastic washers and star washers in place.

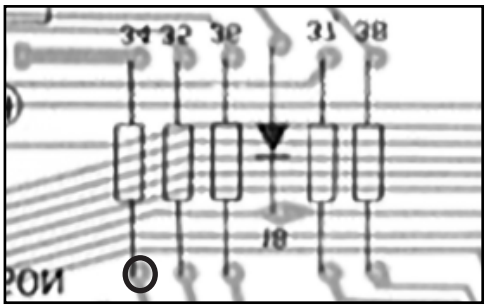
   Fit the 2x included hex standoffs in place of the nuts. Mount the MIDI upgrade board on these using the M3 machine screws and nylon washers.



3. Plug the 2-way cable into the J3 connector on the MIDI board. Solder the two wires to the locations on the panel board as shown below:



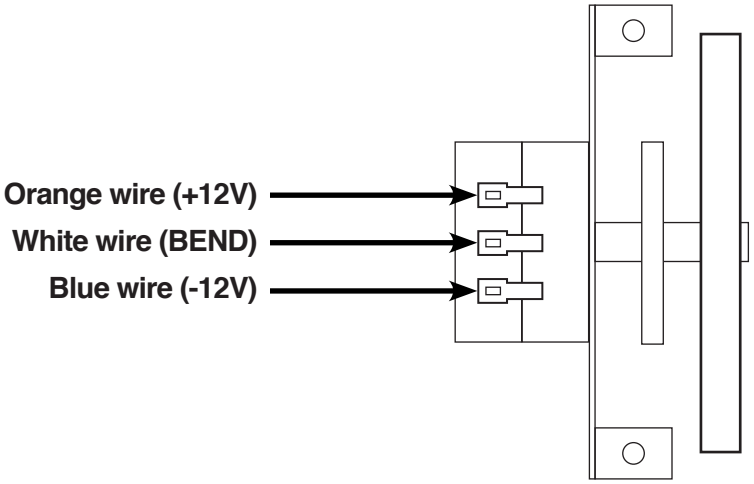
Purple wire (HOLD) to IC1 pin 2



Yellow wire (TAPE) to R34 lower pin

Installation contd.

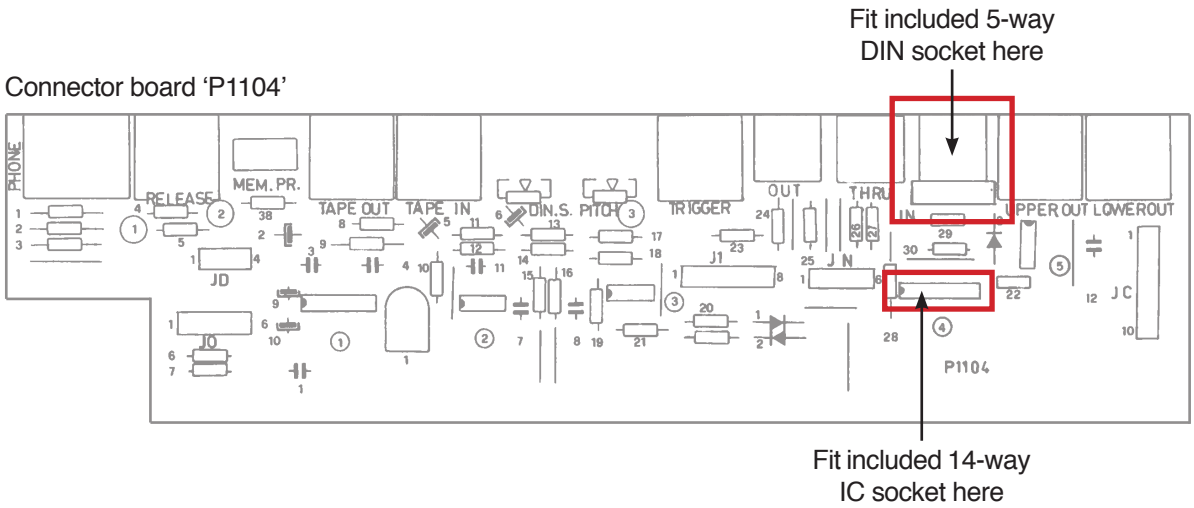
4. Plug the 3-way cable into the J2 connector on the MIDI board. Solder the wires to the terminals of the pitch bend potentiometer as shown, leaving the existing wires in place:



5. Secure these wires in place using the self-adhesive cable tie base and cable ties, to prevent them getting caught in the wheel mechanisms or pinched in the case when it is closed.

6. Unplug the 5x cables from the connector board (P1104). Desolder the ground wire, remove the 7x nuts from the jack sockets, and lift the board out of the synth.

7. Unscrew, desolder and remove the original MIDI IN socket, and fit the included 5-way DIN socket in its place. Desolder IC4 (7404) and fit the included IC socket in its place, paying attention to the orientation.



8. Reinstall the connector board back in the synth, plugging the 5x cables back in, replacing the jack socket nuts and reconnecting the ground wire.

9. Plug the ribbon cable from the MIDI upgrade board into the new IC4 socket on the connector board, making sure that the pins are aligned correctly and that the striped wire is on the left.

Pitch bend calibration

This must be done while the synthesizer is plugged in and turned on. Potentially lethal mains voltages are present in the power supply section, so take appropriate caution while making these adjustments.

Plug a MIDI controller capable of generating pitch bend messages into the Bit One's MIDI IN socket. Set the MIDI channel on the Bit One, as explained on the next page, to match the channel it is transmitting on.

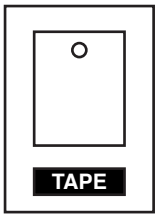
Connect your multimeter to the test point underneath the BIAS trimmer on the MIDI upgrade board. Connect the ground lead of the meter to the thick ground wire in the bottom-centre of the CPU board. Adjust the BIAS trimmer until the meter measures 0.00V.

Play a note on the MIDI controller and apply maximum pitch bend up. Adjust the RANGE trimmer until a 2-semitone bend up is acheived (note that this trimmer operates in reverse - turning it anti-clockwise *increases* the bend range).

You may find that you need to go back and forth making also small adjustments to the BIAS trimmer so that the bend amount is equal both up and down - it's not critical that it's set for 0.00V at the test point when the pitch bend is centred, but this is a good place to start.

If you're having trouble getting it adjusted, make sure that the tuning pot on the back of the synth is set roughly in the midpoint. If the synth itself is totally out of calibration, Tauntek has a good document explaining the calibration process at http://tauntek.com/CrumarBit.htm.

Setup mode - MIDI settings

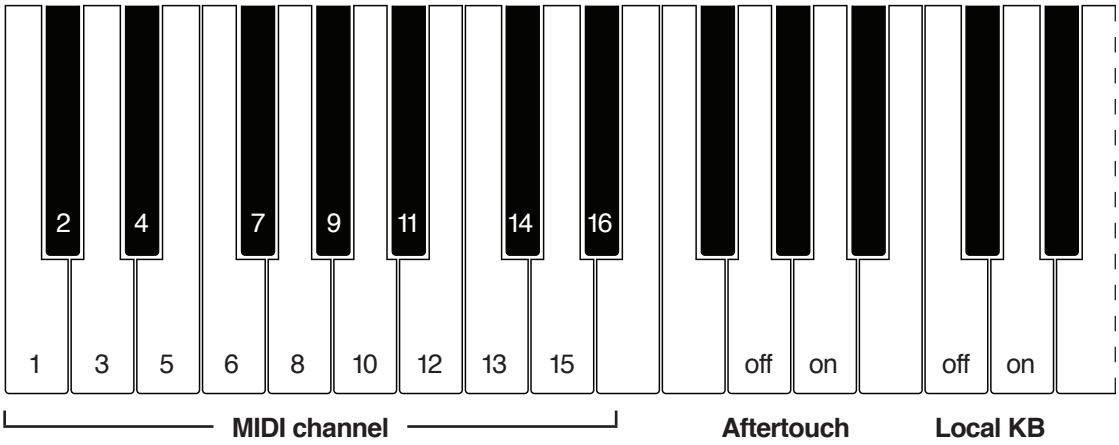


The MIDI upgrade re-purposes the Bit One's tape mode to also serve as a setup mode (tape functions continue to operate as normal). Settings are made using the keyboard while in setup mode.

Pressing the TAPE button will enter setup mode, shown by the LED being lit. Pressing it again will leave it, saving any changes to memory for recall on startup. The current MIDI channel will be shown momentarily on the LOWER PRG display.

Note: If you want to use the setup mode, don't play any keys for a few seconds after powering the Bit One on, as this will activate the synth's keyboard transpose function, which interferes with the key allocation for the setup mode. The transpose function is reset back to normal each time the synth is powered on.

Left end of Bit One keyboard



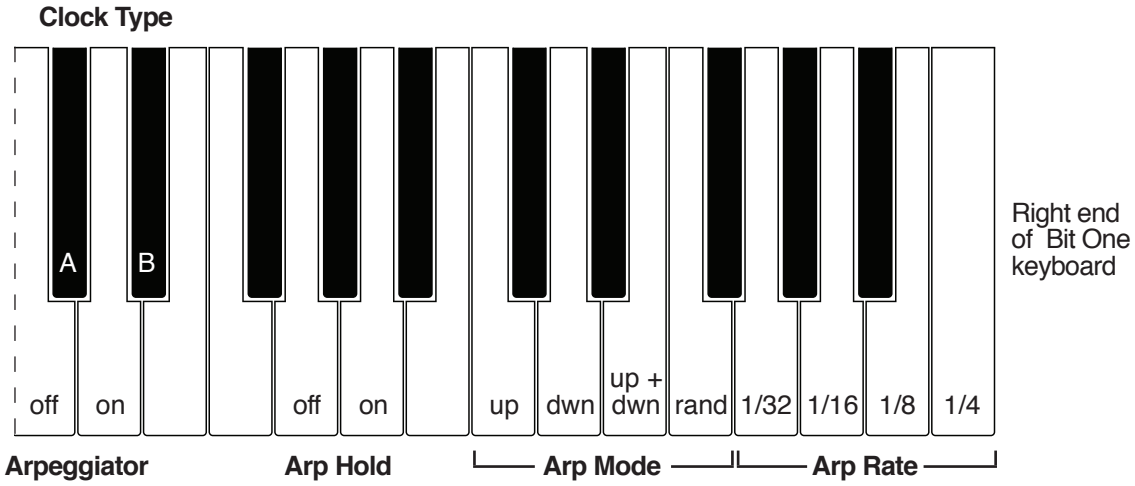
The first 16 keys on the keyboard set the MIDI receive channel.

The Aftertouch setting enables or disables receiving MIDI channel aftertouch, which serves the same purpose as MIDI CC 1 (modulation wheel).

The Local KB setting enables or disables the Bit One's own keyboard, although the synth will still transmit and receive MIDI data.

Setup mode - arpeggiator settings

The MIDI upgrade includes an arpeggiator, the controls for which are also accessed through the setup mode. The arpeggiator settings can also be controlled externally with MIDI CC messages - see next page.



The arpeggiator does not have its own onboard clock source, it requires an external MIDI clock source such as a drum machine. With the arpeggiator turned on, notes will play arpeggiated while the clock source is running. While the clock source is stopped, notes will play as normal - i.e. not arpggiated.

The Clock Type can normally be left on A. If you are finding that the arpeggiator is running slightly out of phase with the clock source, try setting this to B. This only seems to be the case on some very early MIDI drum machines, particularly the Sequential Circuits Drumtraks.

The Clock Type setting is remembered and recalled on startup, but the rest of the arpeggiator settings reset to their default values each time the synthesizer is turned on:

- Arpeggiator = off
- Arp hold = off
- Arp mode = up
- Arp rate = 1/16

MIDI implementation

The upgraded Bit One receives the following message types on a user-specified channel:

Note on / off

Program change

Pitch bend
± 2 semitone bend range.

MIDI clock (start, stop, continue & clock)
If arpeggiator is enabled.

CC 1 - Modulation wheel
Controls intensity of modulation LFO (vibrato). This operates independently from the Bit One's own mod wheel and LFOs, although both can be used simultaneously.

CC 5 - Modulation rate
Controls the speed of the modulation LFO - see above.

CC 64 - Sustain pedal
Performs the same job as the Bit One's hold pedal function.

CC 75 - Arpeggiator mode
0-31 = up
32-63 = down
64-95 = up + down
96-127 = random

CC 76 - Arpeggiator rate
0-31 = 1/32 note
32-63 = 1/16 note
64-95 = 1/8 note
96-127 = 1/4 note

CC 77 - Arpeggiator on / off
0-63 = off
64-127 = on

CC 78 - Arpeggiator hold on / off
0-63 = off
64-127 = on

CC 123 - All notes off
Clears any playing notes.

Channel aftertouch
Performs the same function as CC 1 (modulation wheel) if enabled.

Use with Tauntek firmware

Although originally developed for use in a Bit One running the original firmware, the MIDI upgrade kit is compatible with the Tauntek firmware, which notably adds the ability to control all of the synth parameters with MIDI CC messages. See the Tauntek documentation for more information about this: http://tauntek.com/crumarbit.htm

Note that setting the MIDI receive channel is done in the Setup Mode as explained on page 5, rather than through the parameter editing system. At present, the MIDI upgrade kit does not support System Exclusive messages, so the Tauntek firmware will be unable to receive MIDI patch dumps over SysEx.

To use the synth with the Tauntek firmware, the following parameters must be set:

- Parameter 62 (Sustain Pedal) = 0
- Parameter 63 (Program Change Receive) = 1
- Parameter 64 (Omni Mode) = 0
- Parameter 65 (MIDI Receive Channel) = 1