# Bit One MIDI Upgrade

Installation Instructions
& User Instructions

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This kit includes:

| 1x | Pre-assembled PCB with ribbon cable |
| 1x | 5-pin DIN socket |
| 1x | 14-way IC socket |
| 2x | M3 x 6mm F/F hex stand-offs |
| 2x | M3 x 3mm machine screws |
| 2x | M3 nylon washers |

You will need:

- Fine tipped soldering iron & solder
- De-soldering pump or braid
- Phillips head screwdriver
- Small flat head screwdriver
- Wire strippers
- Small gauge stranded-core wire
- Digital multimeter

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# Installation

1. Remove the top 2x screws from each side panel, and the 3x screws from the lid. Hinge up the lid.

2. Locate and unplug the 5x ribbon cables on the connector board (marked P1104). De-solder the earth wire, remove the 7x nuts from the jack sockets and remove the connector board from the synth.



Connector board shown from the component side.
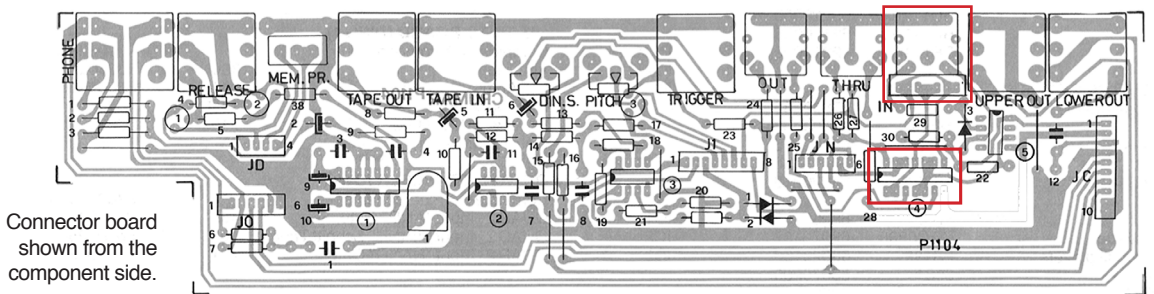
3. De-solder, unscrew and remove the original switched MIDI IN socket, fitting the included 5-pin DIN socket in its place.

4. De-solder and remove IC4 (7409N), fitting the included IC socket in its place.

5. Replace the connector board, re-connecting the ribbon cables and earth wire, and replace the nuts on the jack sockets.



Panel board shown from solder side, as it would be seen in the lid.
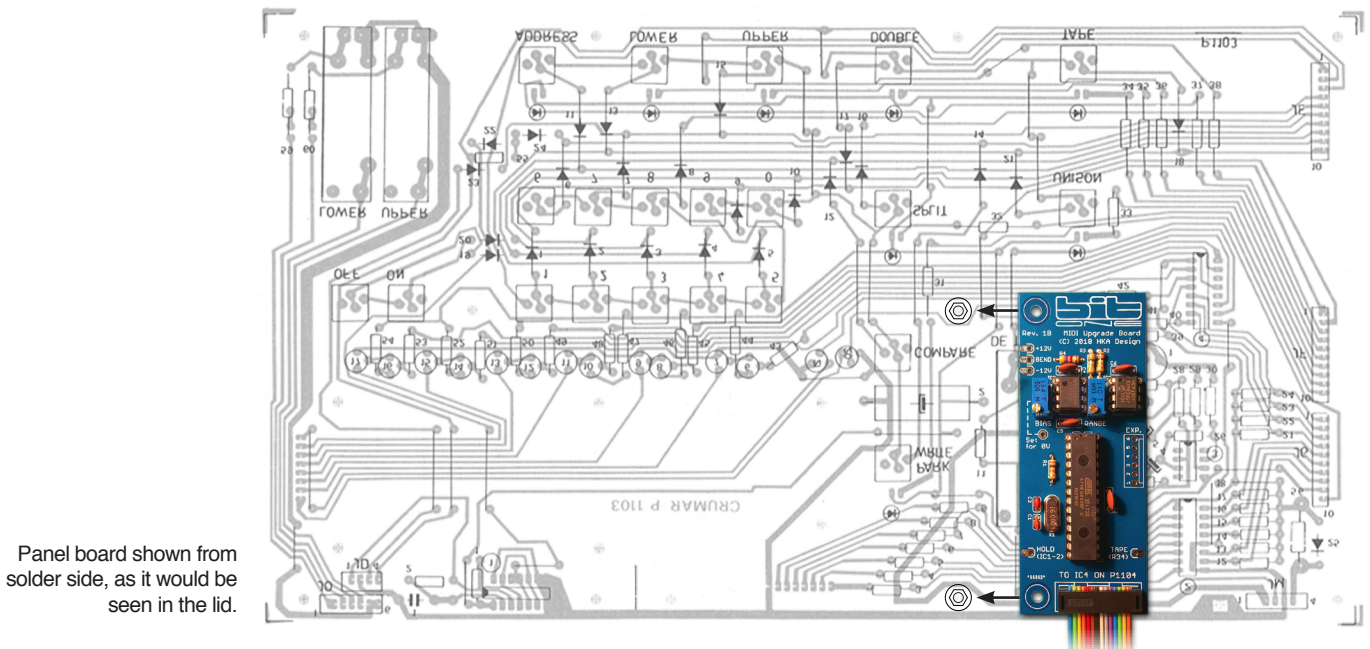
6. Remove 2x M3 nuts from the locations shown on the panel board (P1103), leaving the plastic washers and star washers. Fit the 2x included M3 stand-offs in their place. Mount the MIDI upgrade board on these stand-offs with the included M3 screws and washers.
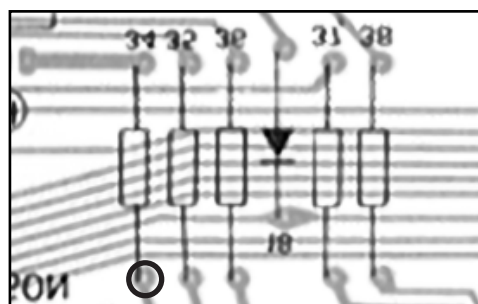
# Installation

7. Ensuring that the pins are properly lined up on the socket, plug the MIDI upgrade board into the connector board, with the ribbon cable going towards the back of the synth (i.e. the cable does not twist).

8. Solder two wires from the pads on the MIDI upgrade board to the locations shown on the panel board as shown below:

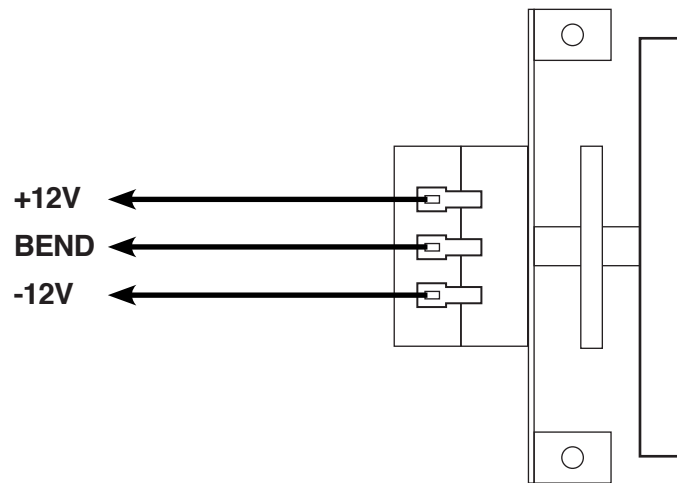Panel board shown from solder side, as it would be seen in the lid.
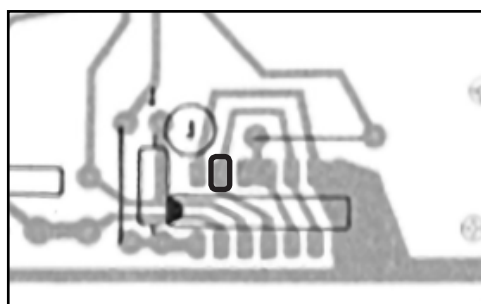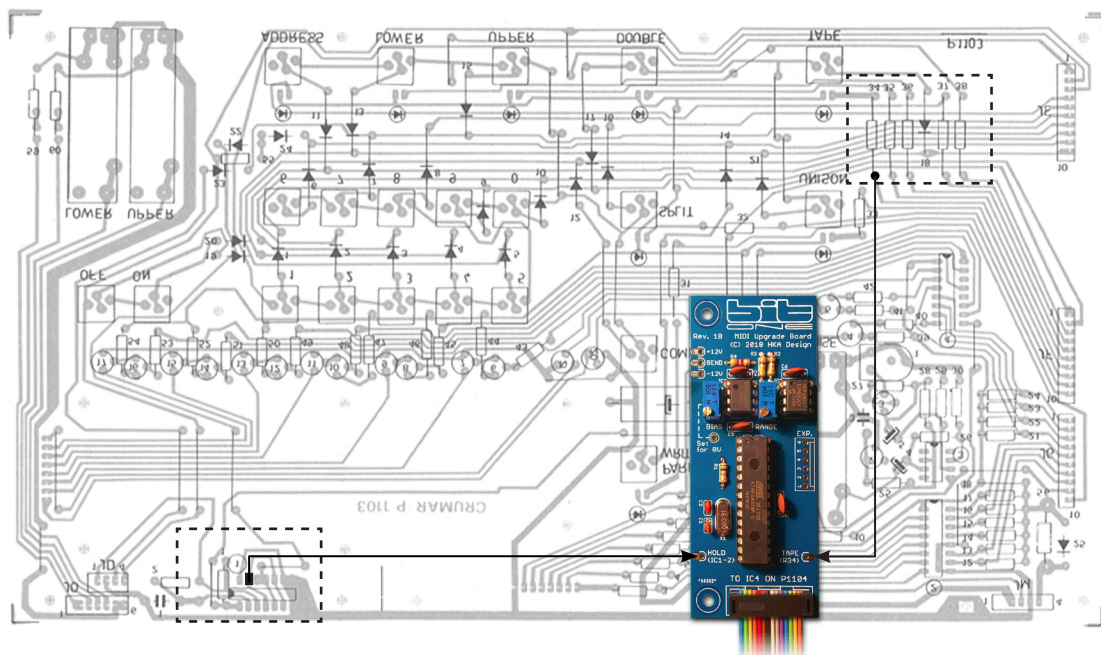




IC1, pin 2 to pad marked **HOLD**



R34, lower pin to pad marked **TAPE**

# Installation

9.  Solder wires from the pads marked **+12V**, **-12V** and **BEND** on the MIDI upgrade board to the terminals on the pitch bend potentiometer as shown, still keeping the existing connections :

**+12V** ←

**BEND** ←

**-12V** ←

# Pitch Bend Calibration

10. With the synthesizer powered on, measure the voltage at the test point directly below the **BIAS** trimmer. Adjust the **BIAS** trimmer until the voltage measures 0.0V. A good place to get a ground connection is the captive nuts that secure the lid to the keyboard assembly.

11. Connect an external MIDI controller capable of producing pitch bend messages, and set the Bit One's MIDI channel (as explained on the next page) to match.

12. Play a note and bend it all the way up on the external MIDI controller. Adjust the **RANGE** trimmer until a 2-semitone bend is achieved.

    You may find that depending on how well calibrated the Bit One itself is, you may need to manually centre the synth's own bend wheel slightly to get the MIDI pitch bend to be properly tuned.

    With the MIDI upgrade board installed, the Bit One's own bend wheel will now produce a ±2 semitone bend rather than the standard ±3.

# Setup Mode – MIDI Settings
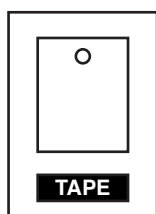
The MIDI upgrade re-purposes the synth's tape mode to also work as a setup mode, the functions of which are outlined below.

Pressing the TAPE button will enter Setup Mode. Pressing it again will leave this mode, saving any changes to memory (which will be recalled on startup). The current MIDI channel will be shown momentarily on the LOWER PRG display.
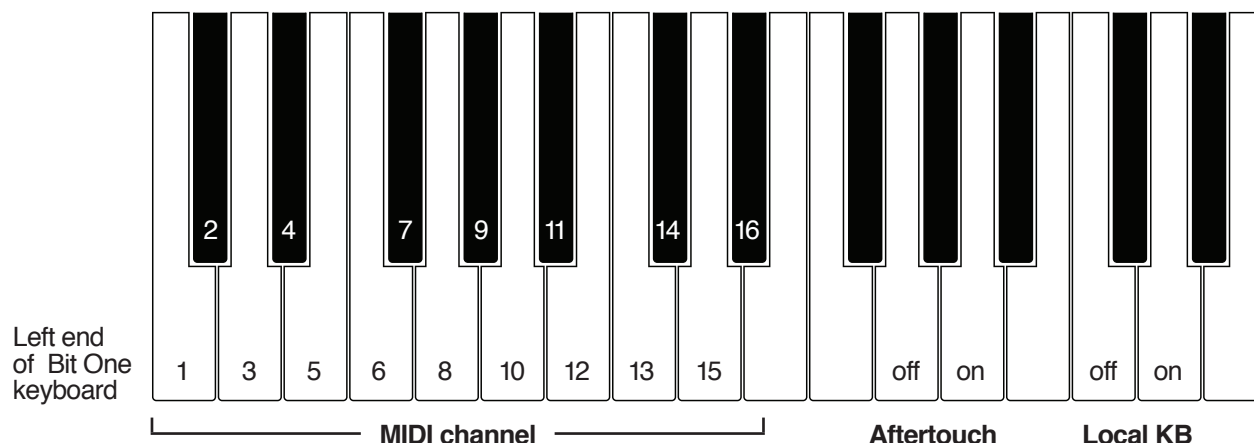
Pressing one of the first sixteen keys on the keyboard will set the MIDI channel.

The Aftertouch setting will enable or disable MIDI channel aftertouch, which if enabled, serves the same purpose as MIDI CC 1 (modulation wheel).

The Local KB setting will enable or disable the Bit One's own keyboard, although it will still transmit and receive MIDI data. This may be of use if you wish to connect the synth to a device such as an external MIDI sequencer.

# Setup Mode – Arpeggiator Settings

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

**Clock Type**

A diagram of a piano keyboard showing the arpeggiator control assignments. The black keys labeled A and B correspond to Clock Type. White keys are labeled: off, on (Arpeggiator); off, on (Arp Hold); up, dwn, up + dwn, rand (Arp Mode); 1/32, 1/16, 1/8, 1/4 (Arp Rate). To the right: "Right end of Bit One keyboard".
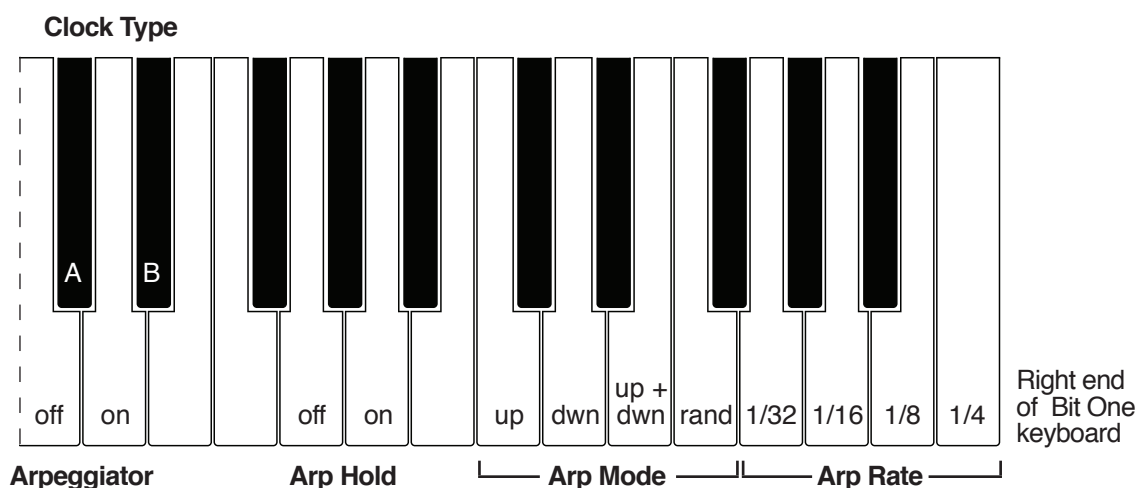
The arpeggiator does not have its own onboard clock source, it requires an external MIDI clock source such as a drum machine.

If the arpeggiator is turned on, upon receiving a MIDI Start message followed by MIDI Clock messages, any notes held down on the local or external keyboard will be arpeggiated, according to the Arp Hold, Mode and Rate settings.

On receiving a MIDI Stop message, or before receiving a MIDI Start message, notes will play as normal.

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 master, 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 will be remembered and recalled on startup, but the rest of the arpeggiator settings will reset to their default values:

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

# MIDI Implementation

The Bit One will now receive 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.

# Using with Tauntek Firmware

The MIDI upgrade kit now has basic support for Tauntek firmware. All extended CCs used by the Tauntek firmware are now passed along to the synth's main microprocessor, whereas before they were filtered out. See the Tauntek documentation for the complete list of MIDI CCs and what parameters they correspond to.

The only exception is MIDI CC 64 (Sustain Pedal), which is handled by the MIDI upgrade board as before.

Setting the MIDI receive channel is done in the Setup Mode as explained two pages back, 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.

The following parameters should be set on the synth:

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