//////////////////////////////////////////////////////////////////////////////////////// MOMI-PLUG //////////////////////////////////////////////////////////////////////////////////////////

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| ////////// 1 – DESCRIPTION //////////  MOMI-PLUG is a modular plug-and-play usbMIDI controller. Most controls are customizable on-board. No software is needed other than your DAW to interpret the MIDI messages sent.  It's also a MIDI to usbMIDI converter and usbMIDI thru port that allows you to daisy-chain both types of MIDI instruments to your computer using a single USB port (while still allowing you to use all the MOMI-PLUG on-board controllers).  It's also an analog input to usbMIDI converter allowing you to connect many different kinds of analog inputs to use as MIDI controllers in your DAW. This includes standard foot switches, expression pedals, potentiometers, piezos, flex resistors, force-sensitive resistors, photo cells, thermistors etc.  The core unit features three buttons, a rotary encoder/'EDIT' switch, a 1/4" expression pedal jack, a 1/4" dual foot switch jack, a MIDI IN port, a USB port, a 2-pin header for analog input and an input for up to 16 additional digital and 16 additional analog inputs.  ////////// 2 – DEFINING THE INTERFACE //////////  You can set which inputs are read and what MIDI channel is used by holding down the EDIT knob. The MIDI channel will be displayed and turning the knob will select a new channel to be set when the knob is released.  The 3 on board LEDs will also display which ports are being read.  1) USB input and 5-pin MIDI in  2) Muxed analog input  3) Muxed digital input  You may switch any of these on or off by pressing the corresponding on-board button. Changes will take effect when the knob is released.  ////////// 3 – EDITING FOOTSWITCHES //////////  Settings may also be changed for each foot switch. While *holding* EDIT, press the foot switch you wish to edit. Each foot switch may be set to latch or momentary mode.  “hold” (the default) indicates momentary mode. This means  that the button or foot switch is ON only as long as you hold it.  CC-OFF messages are sent when released.  “lach” indicates latched mode. This means that you must press  once for a CC-ON message and again for a CC-OFF message.  ////////// 4 – EDITING EXPRESSION PEDAL //////////  The expression pedal may be set to send an additional on/off messages for a different CC number. While *holding* EDIT, when the expression pedal is maxed, one of 2 messages will be displayed.  “-cut” (the default) indicates the standard variable input  behavior only.  “ cut” indicates that a separate CC 'ON' message will be sent  when the value of the main CC message becomes greater than  0 and a CC 'OFF' message will be sent when the value of the  main CC message becomes 0. | ////////// 5 – EDITING 2-IN ANALOG HEADER //////////  The maximum range of any analog input is 0~1023. However, depending on the situation, it may not be possible to make use of that entire range. One example would be using a photo cell in a dimly lit room. You may only get a maximum analog value of say 500. If you want to make use of the full MIDI range (0~127) you can calibrate the analog input.  This can be done by simply holding down the EDIT knob and triggering the analog input. The highest and lowest analog values will be stored and, if the difference in those values is greater than 127, “setH” will be displayed and this indicates that the input is being calibrated.  At this time, you should trigger the highest and lowest values you can. This range will be stored when the knob is released.  ////////// 6 – TRACK MODE //////////  If EDIT is pressed and released with no other input being detected, MOMI-PLUG will toggle between Control Mode and Track Mode. In Track Mode, buttons act like latches even though CC ON *and* OFF messages are sent each time they are pressed. This is to account for Ableton Live's ARM button behavior. There's no way for MOMI to detect when ARM is actually engaged so it just assumes ARM is engaged when the LED is lit. You however, should not assume anything. When getting set up, check that the LED on the MOMI and the ARM button(s) in Live light up at the same time. If not, use your mouse to click the ARM button in Ableton Live.  Turning the encoder left or right in track mode will only have an effect if one or more of the tracks are armed. If one or more tracks are armed, a CC message with a control number corresponding to the armed track(s) will be sent. This may be useful as track volume, balance, send etc.  \*When assigning one of these CCs to a controller in your  DAW, be sure that ONLY ONE track is toggled on.  Foot switches also act differently in Track Mode. One of the switches is assigned with CC number 111 but that number will increase by 1 until it reaches 119. This allows you to assign the same button to 8 different scenes so that you slice as you record or simply move to the next scene during playback.  The other footswitch uses CC number 111 (without incrementing) and should be assigned to the STOP button.  ////////// 7 – MIDI & usbMIDI INPUTS //////////  In addition to being a MIDI controller, MOMI-PLUG also allows you to.   1. Convert any standard MIDI device into a usbMIDI device. 2. Daisy chain a second usbMIDI device. 3. Do BOTH of these at the same time.   Both the USB and MIDI port are plug-and-play. Just be sure they're being read as indicated in section 2.  Any MIDI messages received are passed directly to the computer unless the on-board capacitive sensor is triggered. In that case anything could happen. |

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| TEENSY 3.6 PIN ASSIGNMENTS  \_\_\_\_\_\_  \_\_\_\_| |\_\_\_\_  GND -|-GND| | 5V |  MIDI in |-0 |\_\_\_\_\_\_AGND-|-  MIDI out |-1 (\_) 3.3v-|  Enable FS |-2 (\_) (\_)23 |- Digital MUX return  Enable EXP |-3 (\_) (\_)22 |- Touch 0  Select A |-4 (\_) (\_)21 |- Audio Volume  Select B |-5 (\_) 20 |- Analog MUX return  Select C |-6 19 |- Touch 3  Select D |-7 18 |- Touch 2  LED 3 -| 8 17 |- Touch 1  LED FS1 -| 9 16 |- FS 0 (tip)  LED 2 -| 10 15 |- FS 1 (ring)  LED FS0 -| 11 14 |- EXP return (ring)  EDIT -| 12 13 | LED 0  -| 3.3v GND-|-  Enc A -| 24 A22-| Phones L  Enc B -| 25 A21-| Phones R  LED 1 -| 26 39 |- Analog Head return  Segment G |-27 38-| Cathode 4  Segment D |-28 37-| Segment DP  Segment F |-29 36-| Cathode 3  Cathode 2 |-30 35-| Segment C  Segment B |-31 34-| Segment E  Segment A |-32 33-| Cathode 1  |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_|  \* '-' indicates which direction the wires run. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  |. . . . . . . .|Analog  |. . . . . . . .|Digital  G D 3 3 S S S S  N A V V E E E E  D T L L L L  A | | | |  A B C D  \_\_\_\_\_\_\_\_\_\_  / 2 \  / 5 0=== 4\  | 0=== 0==|  | |  | 0=== 0=|  | 3 1 |  | |  \ \_ /  \\_\_\_\_| |\_\_\_/  5V D- D+ GND  | | | |  \_\_\_\_\_\_\_\_\_\_\_\_  | U U U U |  |\_\_\_\_\_\_\_\_\_\_\_\_| |

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| **CONTROL MODE (Channel 3)** | | | | | | | | | | |
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|  | LEFT BUTTON |  |  | UPPER RIGHT BUTTON |  |  | LOWER RIGHT BUTTON |  |  | ENCODER KNOB | |
| 102 | MIDI switch |  | 103 | MIDI switch |  | 104 | MIDI switch |  | 3 | MIDI variable | |
|  |  |  |  |  |  |  |  |  |  |  | |
|  | FOOTSWITCH 1 |  |  | FOOTSWITCH 0 |  |  | EXP PEDAL |  |  | AVAILABLE | |
| 80 | MIDI switch |  | 81 | MIDI switch |  | 85 | MIDI switch / var |  |  | 9 46 47 87 89 90 | |
|  |  |  |  |  |  |  |  |  |  | and 111~119 | |
|  | ANALOG HEAD |  |  | ANALOG MUX |  |  | DIGITAL MUX |  |  |  | |
| 14 | MIDI switch / var |  | 16~31 | MIDI switch OR var |  | 48/63 | MIDI switch OR var |  |  |  | |
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| **TRACK MODE (Channel 5)** | | | | | | | | | | |
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|  | LEFT BUTTON |  |  | UPPER RIGHT BUTTON |  |  | LOWER RIGHT BUTTON |  |  | ENCODER KNOB | |
| 105 | arm / disarm Track 1 |  | 106 | arm / disarm Track 2 |  | 107 | arm/disarm Track 3 |  | 108 | Volume for Track 1 | |
|  |  |  |  |  |  |  |  |  | 109 | Volume for Track 2 | |
|  | FOOTSWITCH 1 |  |  | FOOTSWITCH 0 |  |  |  |  | 110 | Volume for Track 3 | |
| 82 | record |  | 83 | Stop |  |  |  |  |  |  | |
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| **BETWEEN** | |  |  |  |  |  |  |  |  |  | |
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|  | LEFT BUTTON |  |  | UPPER RIGHT BUTTON |  |  | LOWER RIGHT BUTTON |  |  | ENCODER KNOB | |
| / | read MIDI |  | / | read Analog MUX |  | / | read Digital MUX |  | / | change MIDI channel | |