

## **External Clocking of MSII (white and black, 2014 editions) JR\_15 (ed. 1)**

### **Using an Arduino**

(correspondence with Fredrik Ostling)

There is a 33k resistor (R15) at the clock input on the MSII, the bottom left resistor (orange, orange, black, red, brown). This value appears very slightly too high for the Arduino to clock the MSII. As discussed below, when using an Arduino as an external clock, this value is right on the threshold.

The value of R15 was set so that the sensitivity of the touch grid was correct when using the internal clock and a 9v battery power supply. On early MSII prototypes a 10k resistor was used for R15. This allowed for the MSII to be clocked externally at lower voltages, but the use of a 10k resistor prevented the touch grid freeze function working properly.

It is a very fine balance. The Arduino does not quite output 5v. I tried powering the Arduino using an external power supply with voltages of 9v and 12v, but there is a 4.9 volt reading at pin 13. There is more on Arduino output voltages here:

<http://forum.arduino.cc/index.php?topic=210633.0>

If a 1M resistor is bridged across (parallel) the 33k (R15 resistor) it works! This makes a very slightly lower resistance value: 31.94578896 K (1M + 33k resistors in parallel). In fact if you just bypass the resistor with a piece of wire it also works: NOTE this will prevent the touch freeze and reset working correctly when using the default internal clock.

Solutions:

1. Power MSII from Arduino (same voltage ref)
2. R15 swap for 30k resistor or less
3. 1M resistor in parallel to R15 33k (back of board) (reduces to 31.9k)

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### **Synching two MSII's (with reference to MSII guide and patchbay)**

Select a master and slave from the MSII's

MSII\_A (master). Set-up in normal operation mode with the internal clock. The internal clock jumper (patchbay 30) must remain inserted.

Connect MSII\_A (master) clock source - internal (tie/out) (patchbay 29) to MSII\_B (slave) clock source - external (patchbay 28). Make sure the polarity is correct (top-/btm.+)

Use a patchbay connector (see MSII extras at [dirtyelectronics.org](http://dirtyelectronics.org))

MSII\_B (slave). Remove internal clock jumper (patchbay 30)

Adjust the tempo using the settings of the master synth

Each synth can be powered independently