

MA30.3 MK2 auto-function doesn't work

See in below the results of our investigations (3 pages incl. this one)

Test set up for opamp function

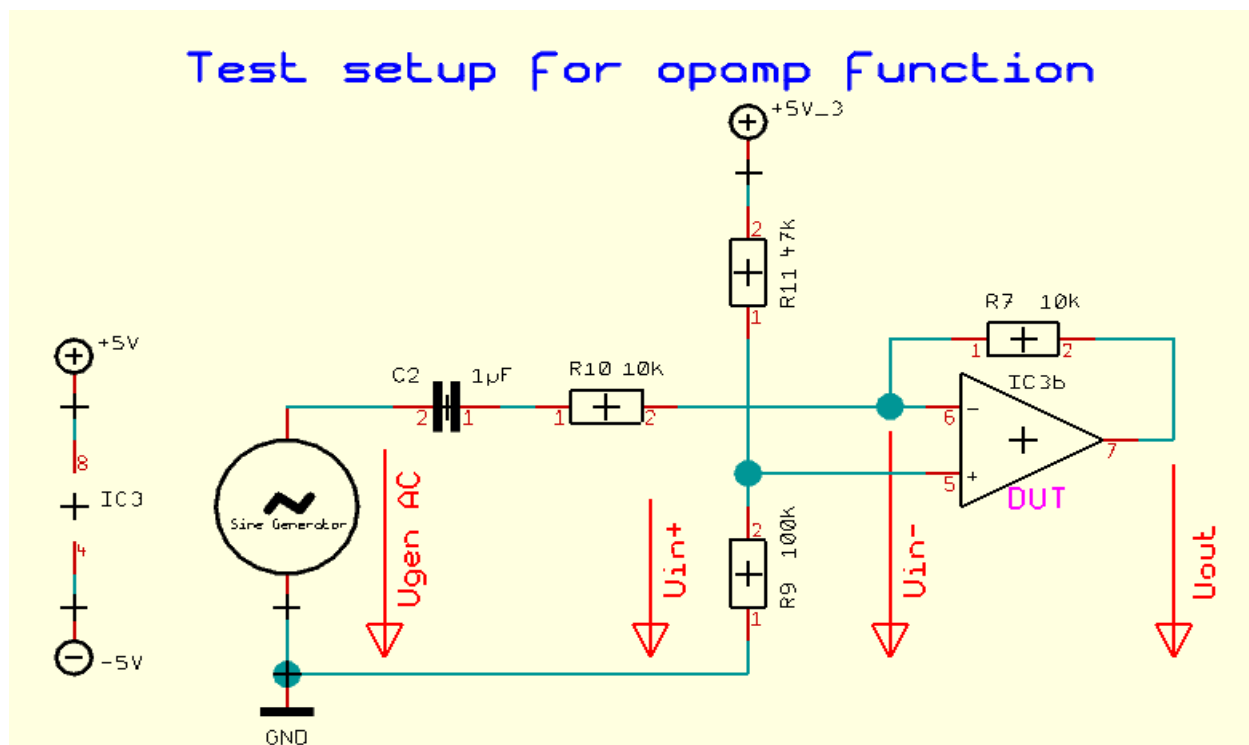
The opamp has been tested in the original MA30.3 MK2's input board
This has been done in order to avoid damage to the IC when soldering out.

We removed R1, R6, C3, R13 (see MA30.3 MK2 schematic)

So, section 2 of the the amp was completely free from any peripherals

Section 1 remained as it was

Then we added parts according to below schematic in order
to test the amplifier function

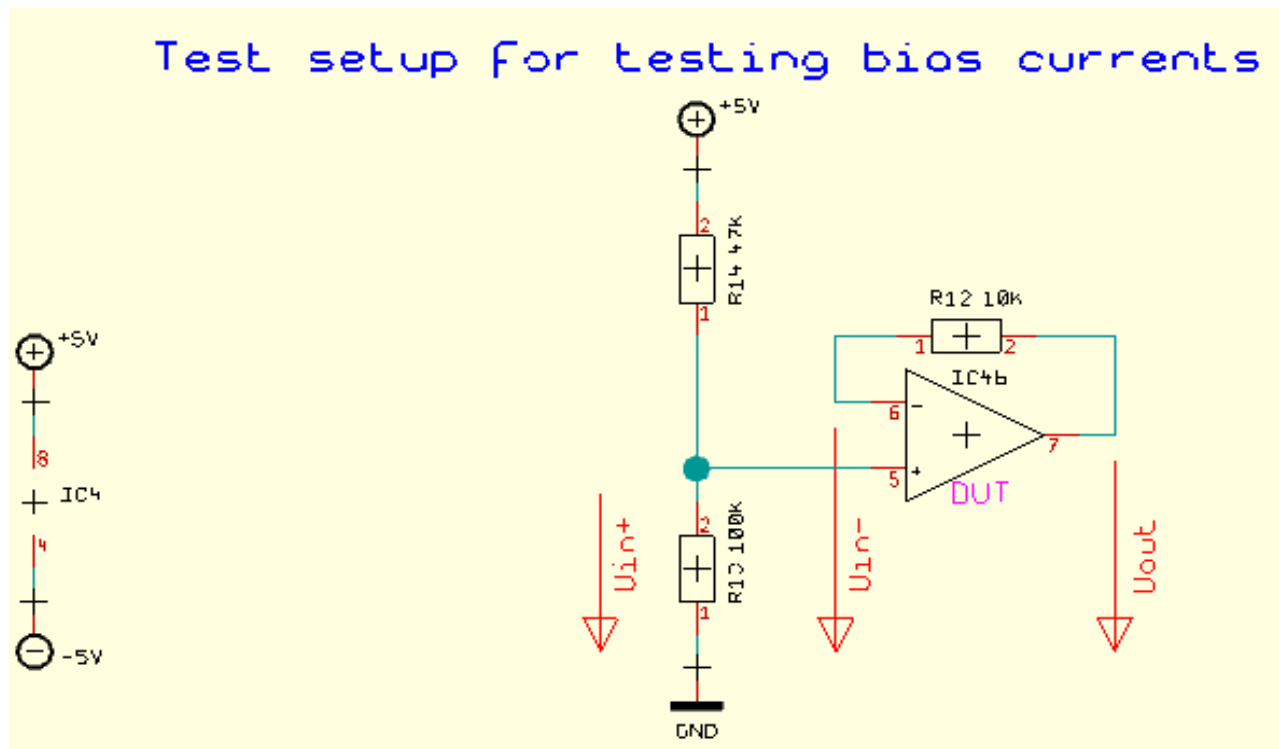


In this circuitry the amp works as expected:

$$U_{outAC} = -U_{genAC} \text{ (within limits of supply voltage)}$$

Test setup for testing bias currents

For testing bias currents we removed the generator curcuitry



If no (or neglectable) input currents are present U_{in+} can be calculated as:

$$U_{in+} = 5V * 100k / (100k + 47k) = \mathbf{3.4VDC}$$

Measured value was **2.4VDC**!

Calculation of input current on pin 5 (non inverting input):

source impedance of divider is: $1 / (1/47k + 1/100k) = 31.97k$

idle voltage of divider is $5V * 100k / (100k + 47k) = 3.4V$

voltage drop due to opamp is $3.4V - 2.4V = 1V$

so, input current on pin 5 is about $1V / 31.9k = \mathbf{31.3\mu A}$

We measured the voltages on pins 5 and 6 (U_{in+} , U_{in-}): **Both 2.4VDC**

That means that the opamp works and has neglectable input offset voltage

Then we measured the output voltage (U_{out}): **2.7VDC**

Means a voltage drop over the 10k feedback-resistor of **.3VDC**

Calculation if input current on pin 6 (inverting input):

$$\text{Input current on pin 6} = .3V / 10k = \mathbf{30\mu A}$$

Conclusion:

If we neglect some minor inaccuracies in our calculations
the opamp's bias currents are about 30 μA on each pin

As both pins are at the same voltage,

possible clamp diodes due to new design cannot cause this
(btw: the updated data sheet doesn't mention such diodes...)

The data sheet (latest version) allows under worst conditions
an input bias current of max. 5nA (-40 to + 85 degrees Celsius)

The measured values at 25°C are by factor 6000 higher

So, we are sure the built-in opamps

are really NOT genuine OPA 2134

and the reason why the MA30.3's auto-function doesn't work