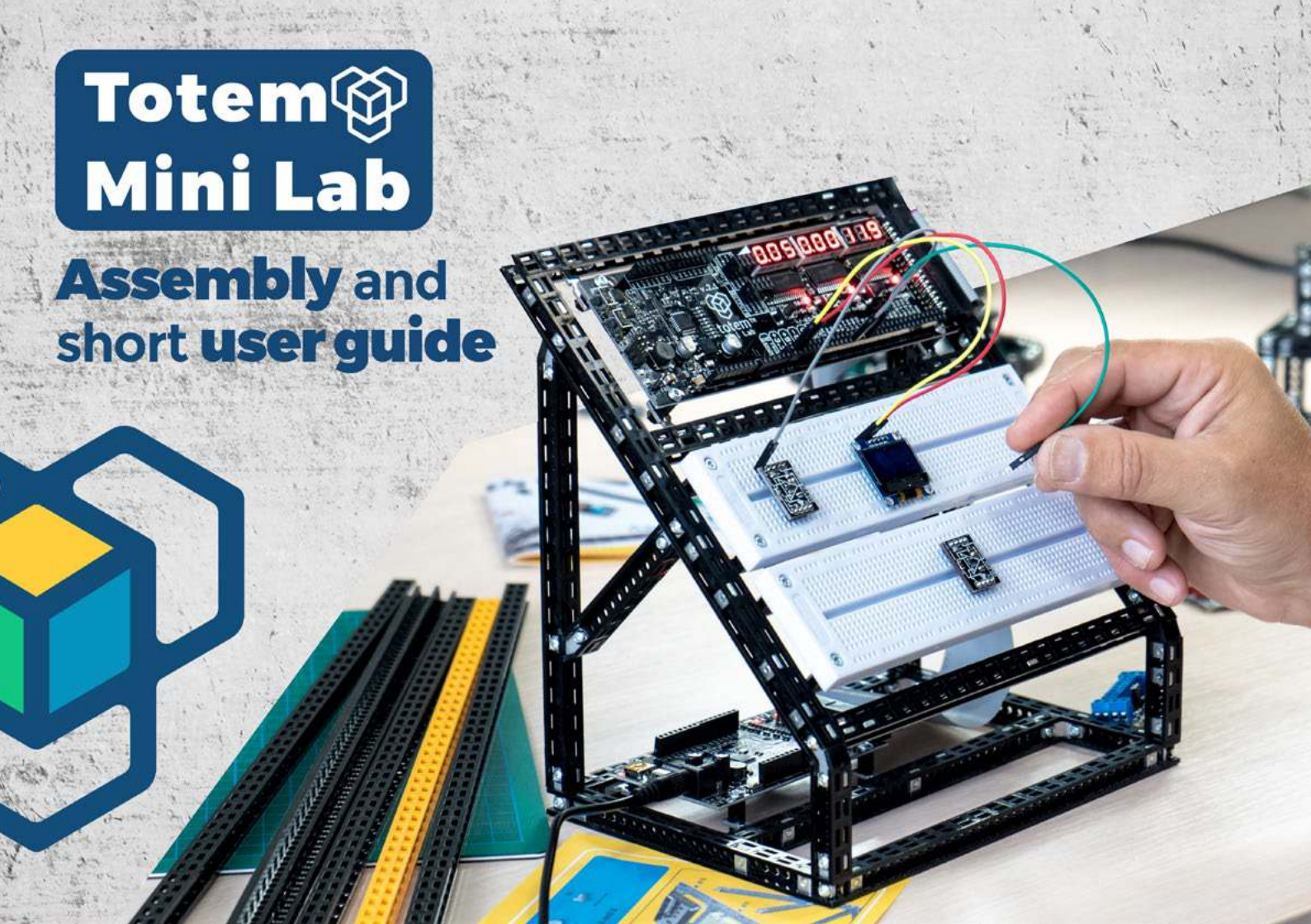
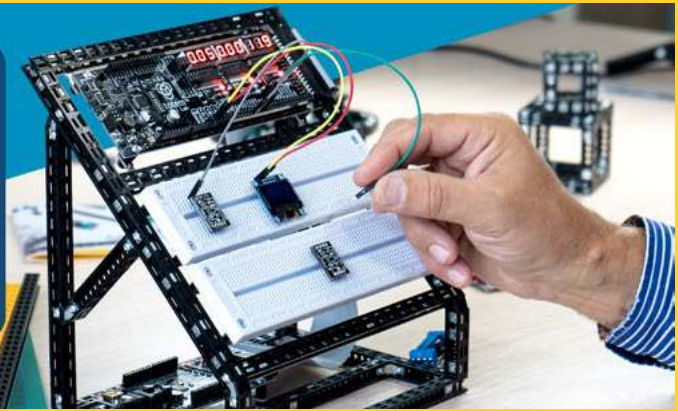
Totem Mini Lab

Assembly and short user guide



Totem Mini Lab



Totem Mini Lab is a great platform to experiment, learn basics of electronics and Arduino coding. We have made an all-in-one breadboarding and testing unit, that gives you several useful features:

- Different power supplies : -5v, 3.3v ,5v, 12v , and one you can regulate;
- Measurement of voltages with 3 ranges, outputs from 3 DACs;
- Easy, short access to all the Arduino I/O pins;
- All signals available in a single row just above the breadboards.

PARTS LIST

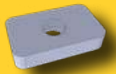
72x

M3 6mm bolt

8x

M3 12mm bolt

64x



Nut M3 6x10

16x

Nylon Nut M3

12x

C-Bracket

16x

Nylon Spacer M3 8mm

6x

2-hole Simple

8x

L-Twist adj.

6x

Single side filler

8x

L-Twist adj. mirror

6x

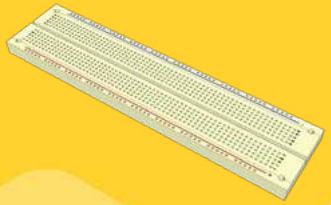
2-hole 45 simple

Beams:

Beams 4cm	2x
Beams 7cm	2x
Beams 14cm	2x
Beams 16cm	2x
Beams 18 cm	5x
Beams 20cm	3x

Use the Totem hyper-magnetic screw-driver to build this model.

2x Breadboards
CYB-120



1x TotemDuino
1x LabBoard
1x 30cm 34way Flat Cable
1x Power Supply 12v 1,5A

Build step number

X

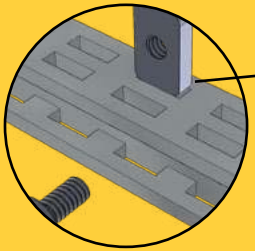
#n — How many to build.

This panel shows what to build in this step.

Sub Assembly name — A-Z

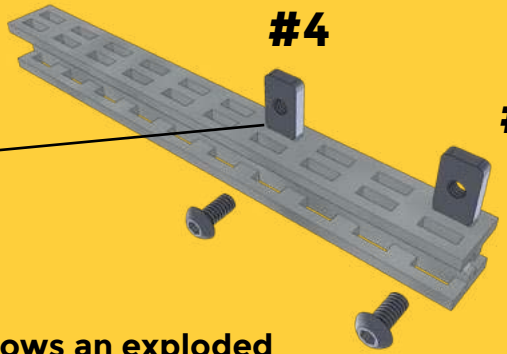
This panel shows what parts you need to build this step.

Parts that the sub-assemblies needed.



Loop view of details

This section shows where the Sub-assembly belongs in the model.

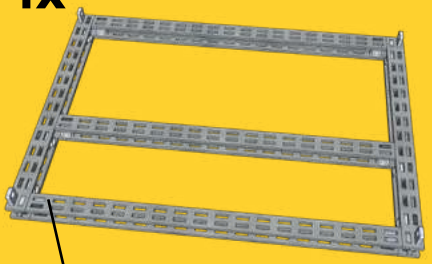


This panel shows an exploded view of how to build this step.

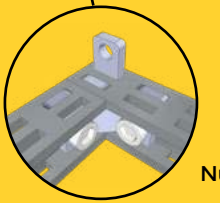
The #n notifies in which slot in the beam the rectangular nut should be put.

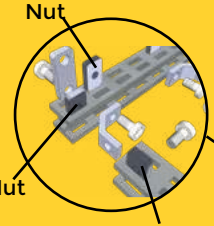
1

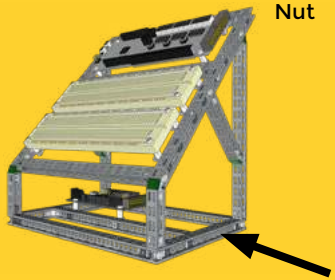
1x



A







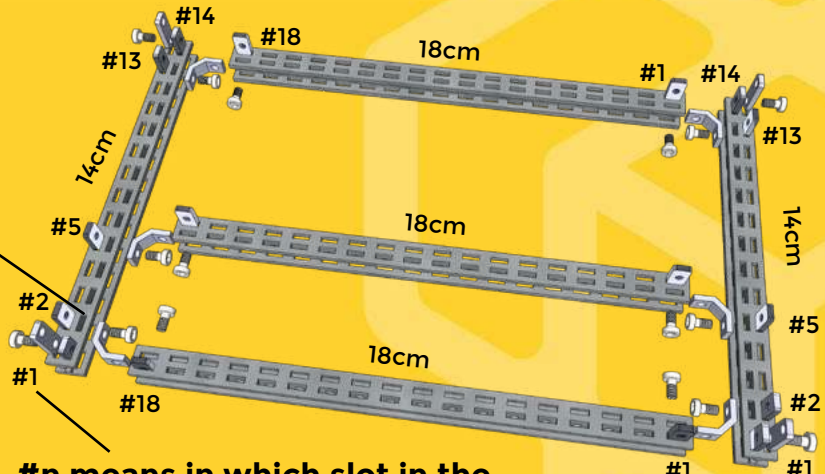
6x C-Bracket

16x Bolt M3 6mm

4x 2-hole Simple

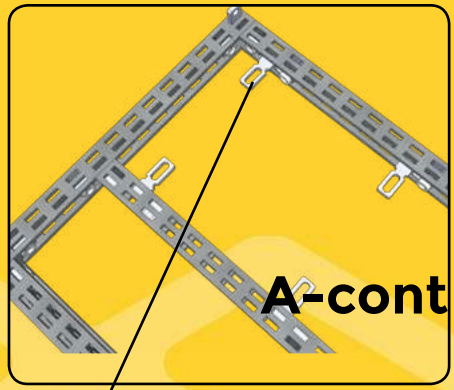
16x Nut M3 6x10

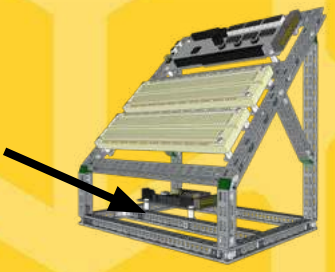
Beams : 2 x 14cm , 3 x 18cm

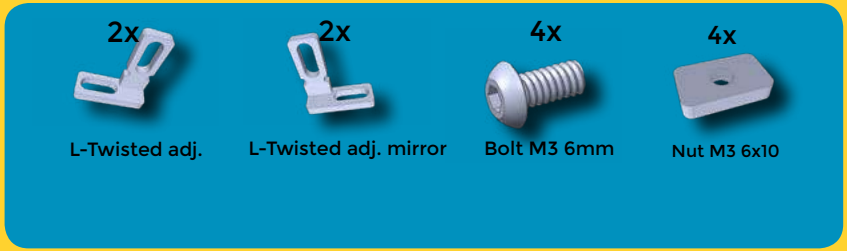


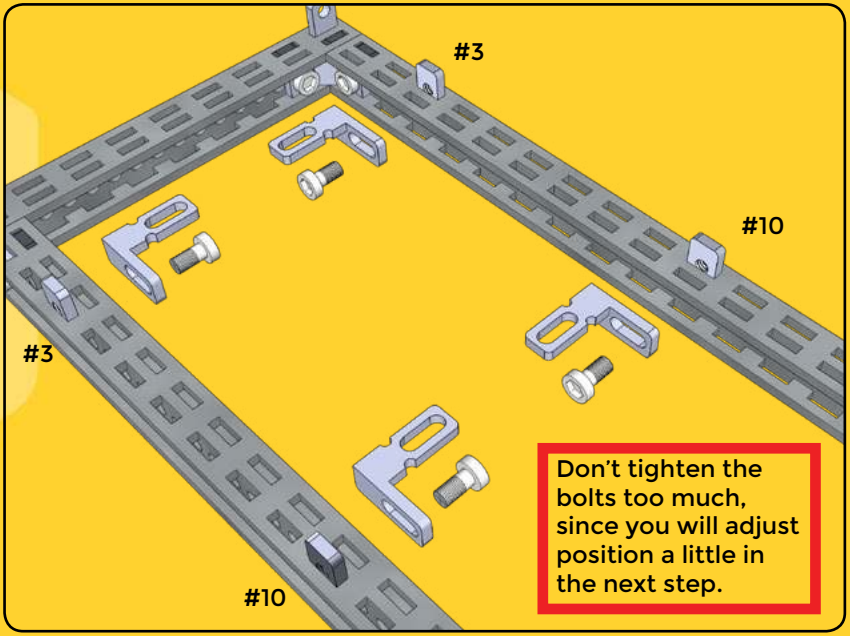
#n means in which slot in the beam you should put the nut.

2


A-cont

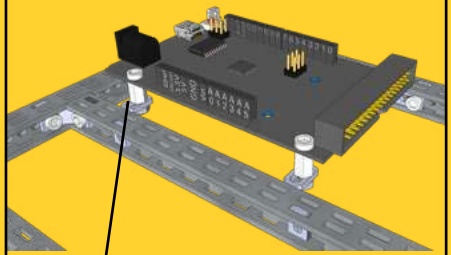



2x
L-Twisted adj.
2x
L-Twisted adj. mirror
4x
Bolt M3 6mm
4x
Nut M3 6x10


#3
#10
#3
#10
Don't tighten the bolts too much, since you will adjust position a little in the next step.

3

A-cont



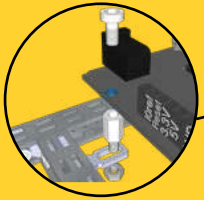
4x M3 6mm bolt

4x Nylon Spacer M3 8mm

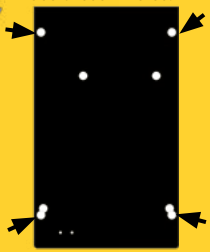
4x Nylon Nut M3

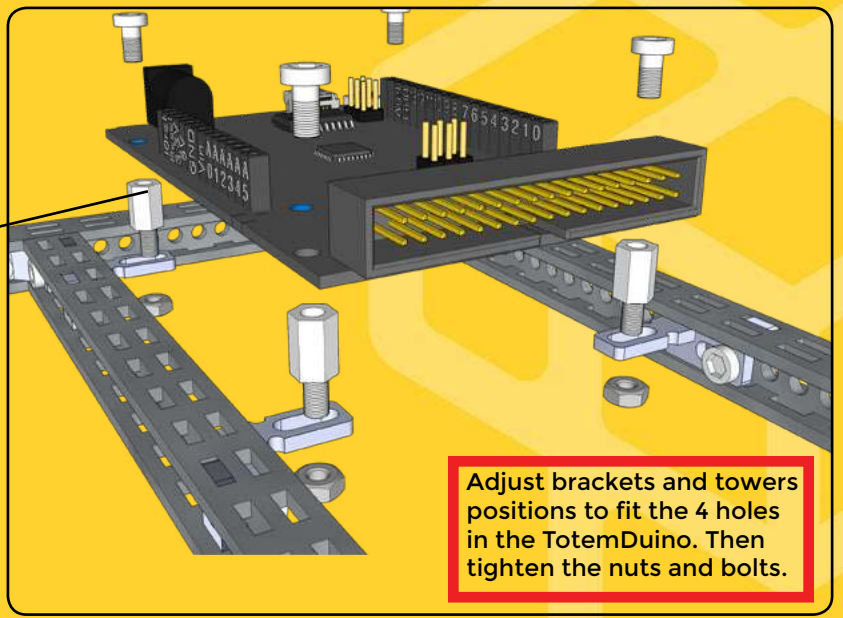
1 x TotemDuino

OBS : Nylon Spacers and Nuts may be black!



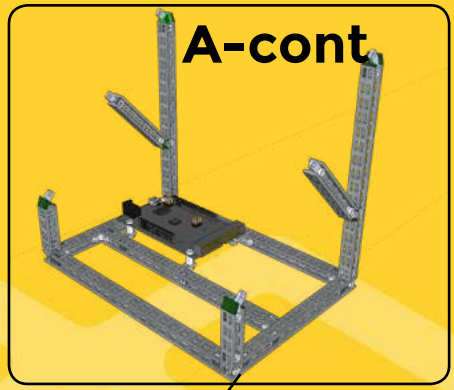
Use these 4 holes:

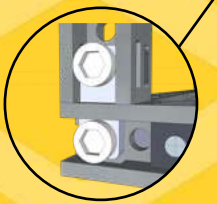


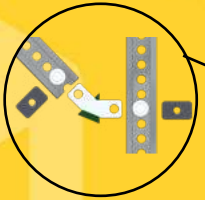


Adjust brackets and towers positions to fit the 4 holes in the TotemDuino. Then tighten the nuts and bolts.

A-cont

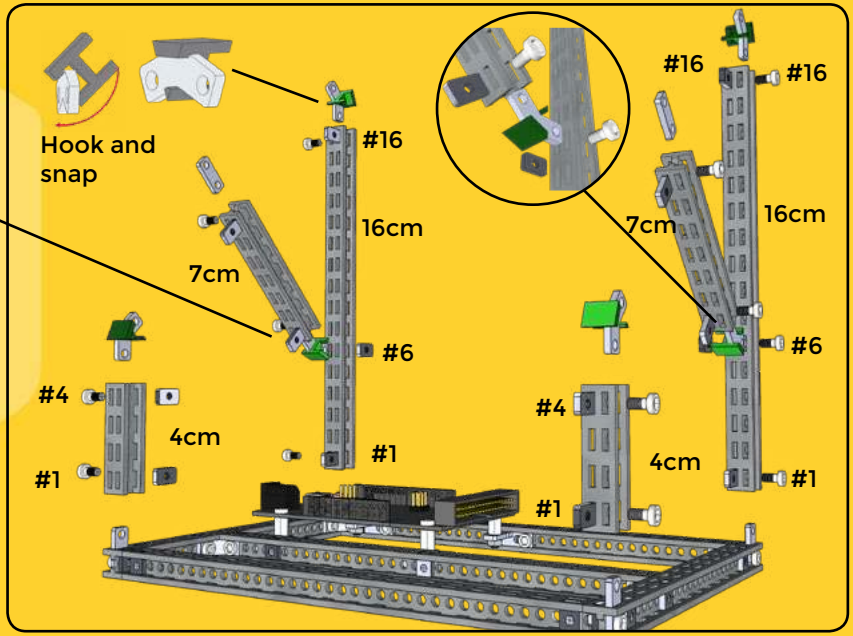




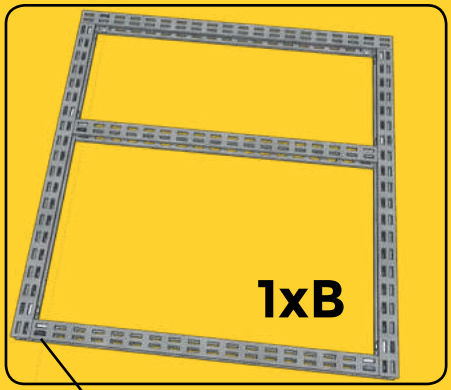


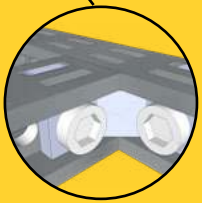
6x	2x	14x	14x	6x
2-hole 45 simple	2-hole Simple	Bolt M3 6mm	Nut M3 6x10	Single side filler

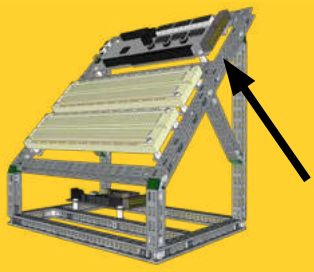
Beams : 2 x 4cm , 2 x 7cm , 2 x 16cm



5





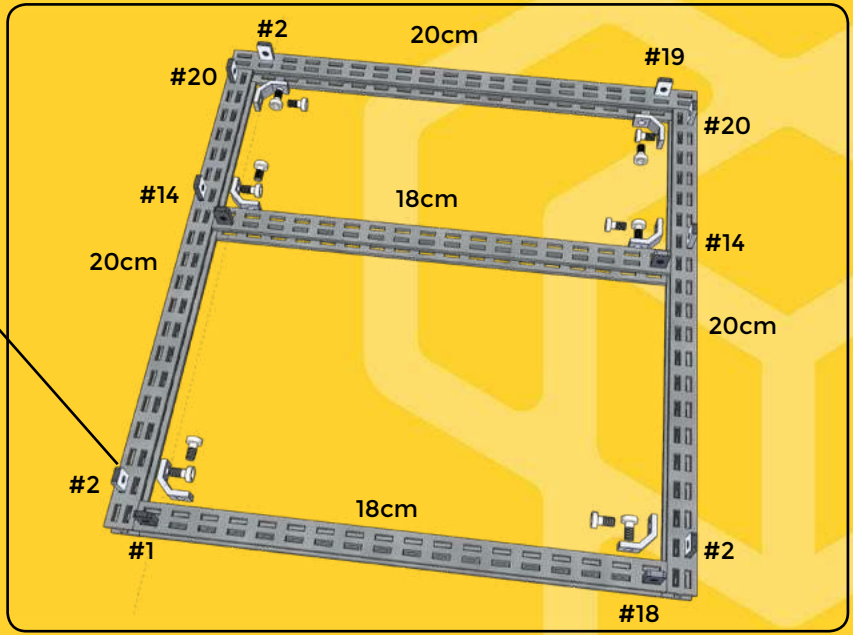


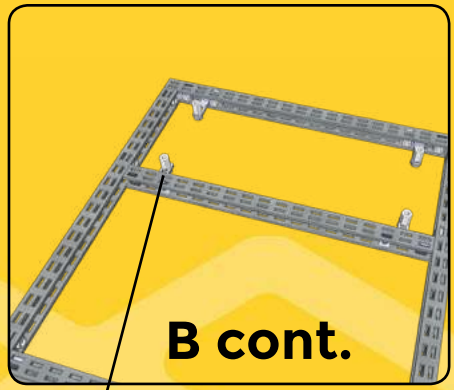
12x
Bolt M3 6mm

12x
Nut M3 6x10

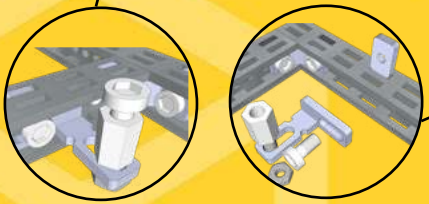
6x
C-Bracket

Beams : 3 x 20cm , 2 x 18cm





B cont.



2x L-Twist adj.

2x L-Twist adj. mirror

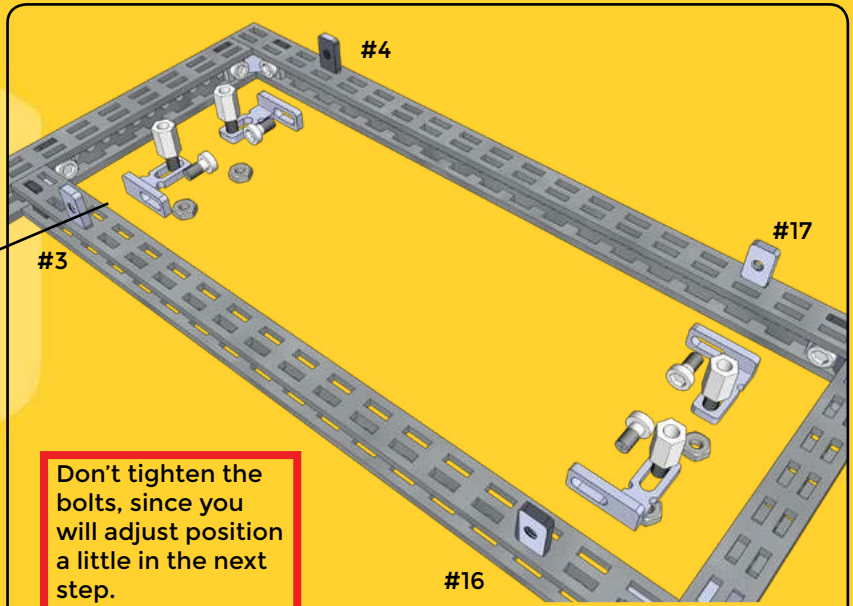
4x Nylon Spacer M3 8mm

4x Nylon Nut M3

4x Nut M3 6x10

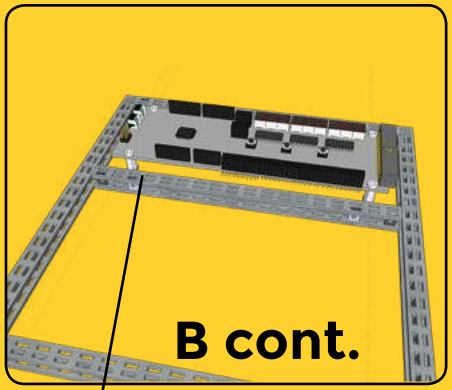
4x Bolt M3 6mm

OBS : Nylon Spacers and Nuts may be black!

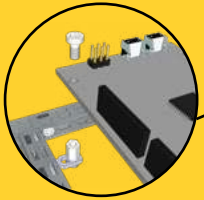


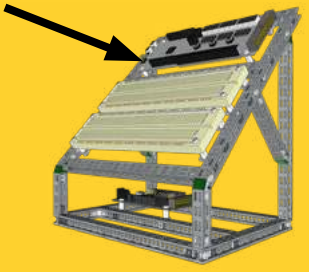
Don't tighten the bolts, since you will adjust position a little in the next step.

7



B cont.

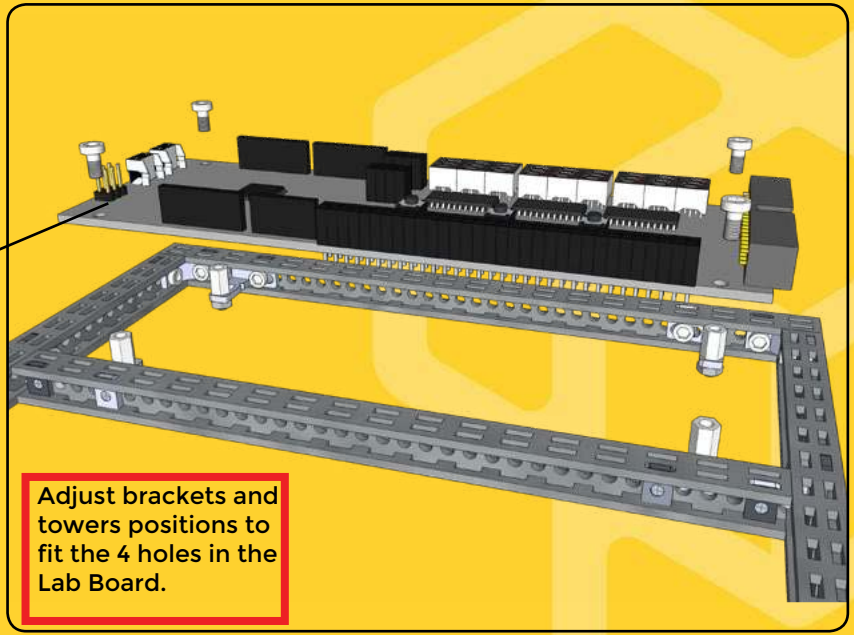




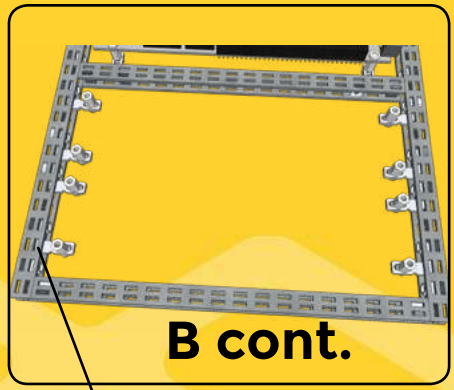
4x

Bolt M3 6mm

1 x Lab Board



Adjust brackets and towers positions to fit the 4 holes in the Lab Board.



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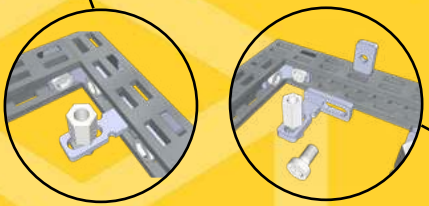
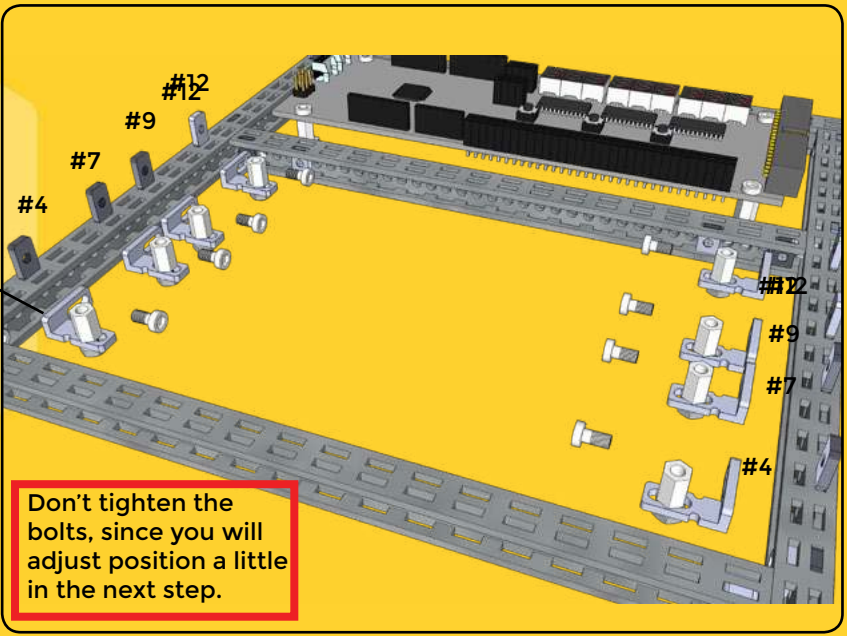
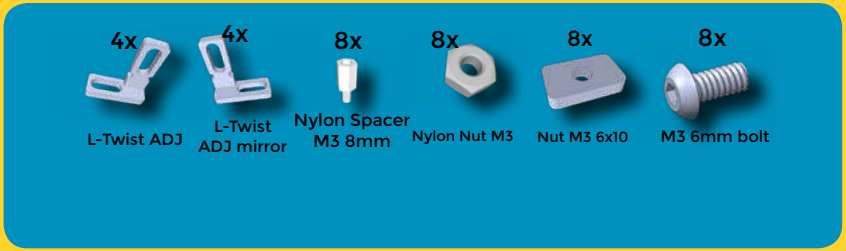
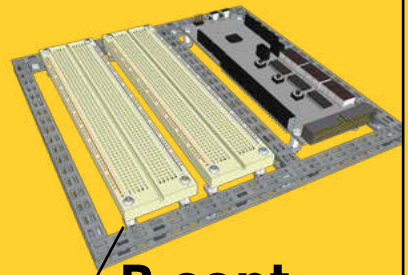




Don't tighten the bolts, since you will adjust position a little in the next step.





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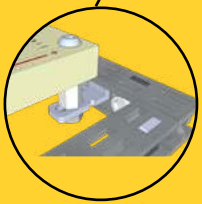
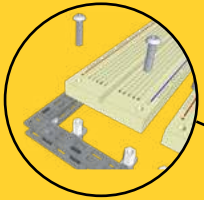
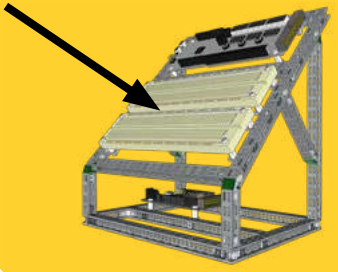


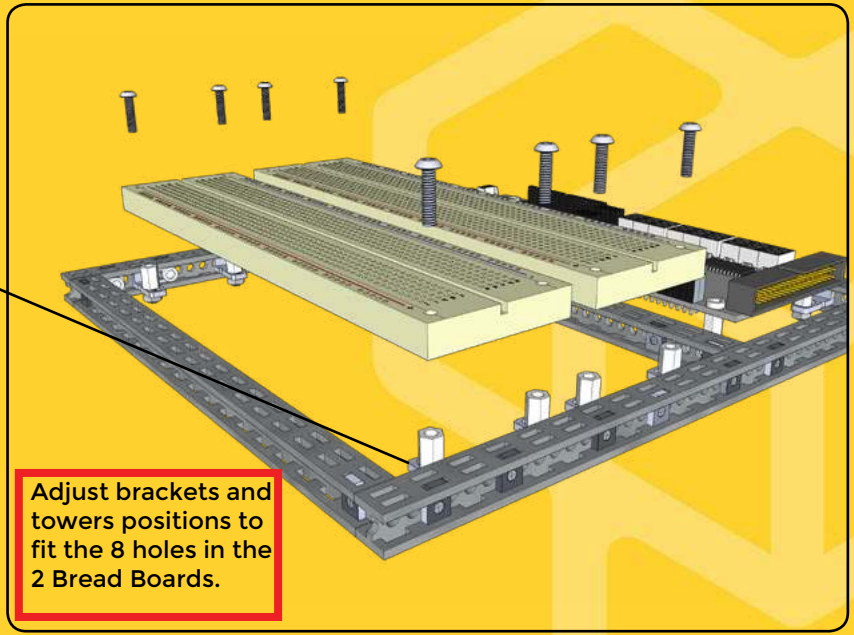




8x

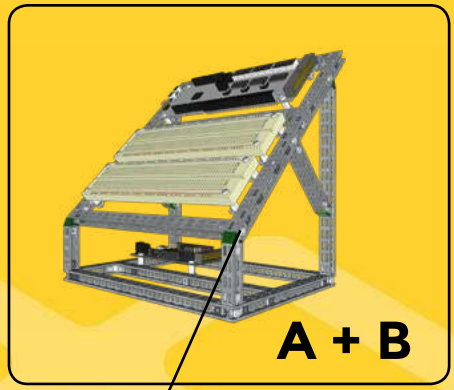
M3 12mm Bolt

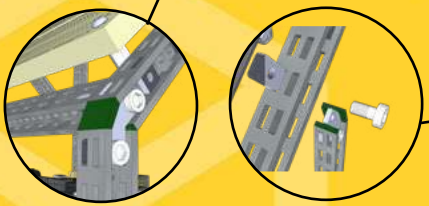
2x CY-120 Breadboard



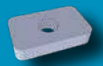
Adjust brackets and towers positions to fit the 8 holes in the 2 Bread Boards.

10





6x

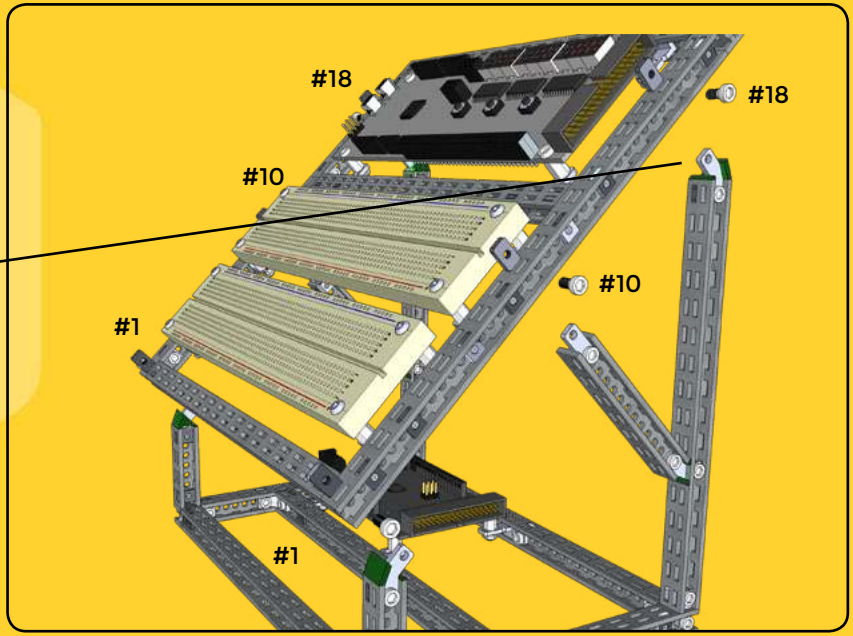


Nut M3 6x10

6x

M3 6mm bolt

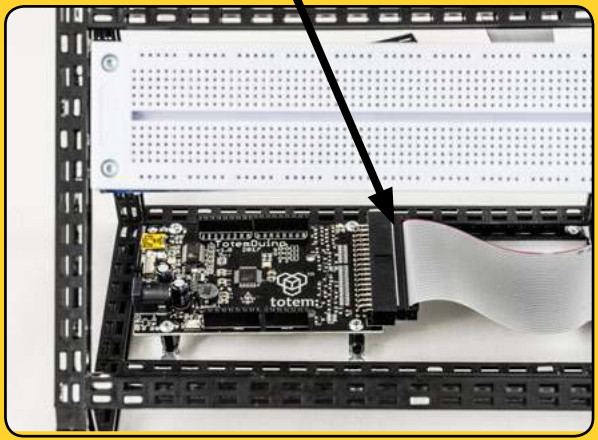
Sub assemblies A and B



FINAL STEP
Attaching the flat cable.

1x Flat Cable , 34 wires, L=300mm

Attach the flat cable to the TotemDuino like this.



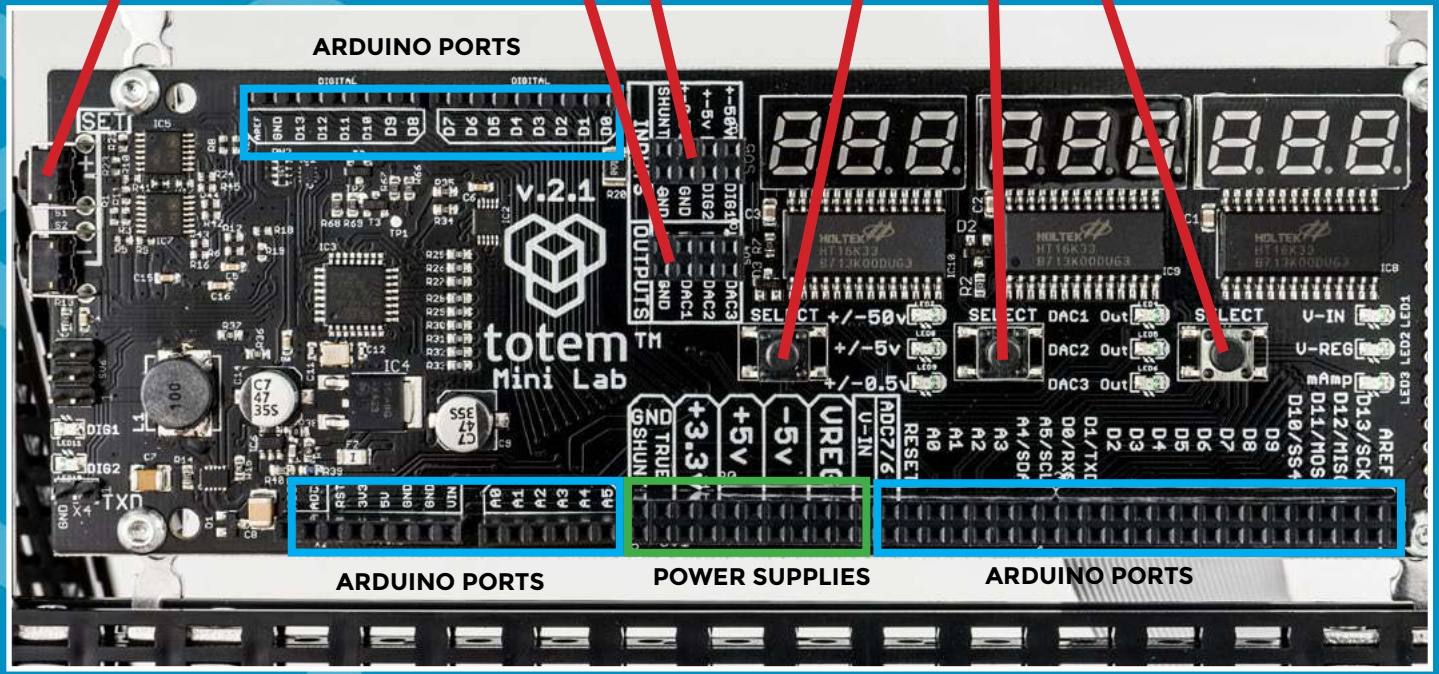
Attach the flat cable's other end to the LabBoard, by loosening the bolts, so you can lead the Flat Cable up to the connector.

Short User Guide 1. Overview

SET BUTTONS
Use these buttons to set the value you want for the DAC outputs, and the regulated power output “VREG”.

INPUT AND OUTPUTS
From these connectors you can patch to your circuit one of the breadboard for measuring and DAC output voltages.

SELECT BUTTONS
Selects what the LED displays above will show.

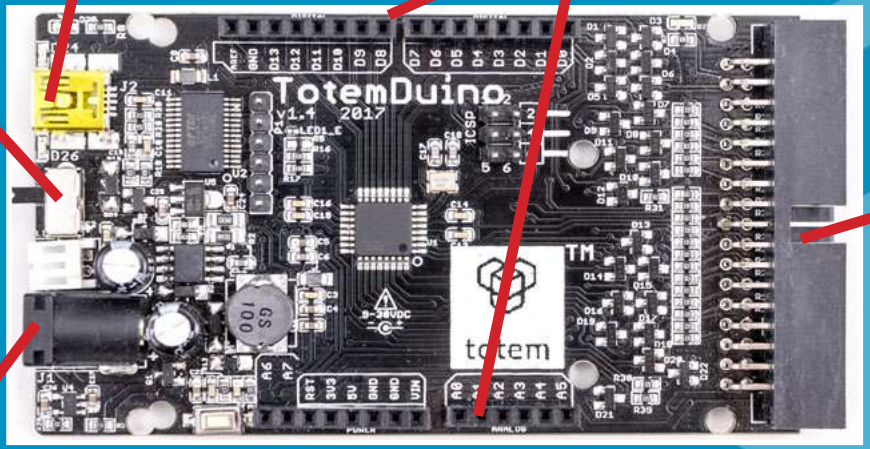


2. The TotemDuino Overview

USB MINI port
Use this port to upload your sketch to the TotemDuino.

The standard Arduino SHIELD connectors.

This switch selects if your ATmega should run on 3.3v or 5v. See the position guide on the underside of the board.



Arduino Ports Connector

On this 34way Flat Cable connector, all I/O ports and several power lines are available. Via a Flat Cable the signals are connected to the LabBoard. All I/O signals are protected with diodes and serial resistors, so it would be more difficult to destroy the ATmega microprocessor pins.

The Power Input. (V-IN)

Apply the power supply to this connector. Range from 9v to 20v. The nominal voltage is 12volts. More than 1 amp is advised. Remember it feeds power to the LabBoard as well.

Remark about the power supplies available

The TotemDuino generates a 250mA 3.3v and a 1.0A 5v supply available also on the LabBoard.

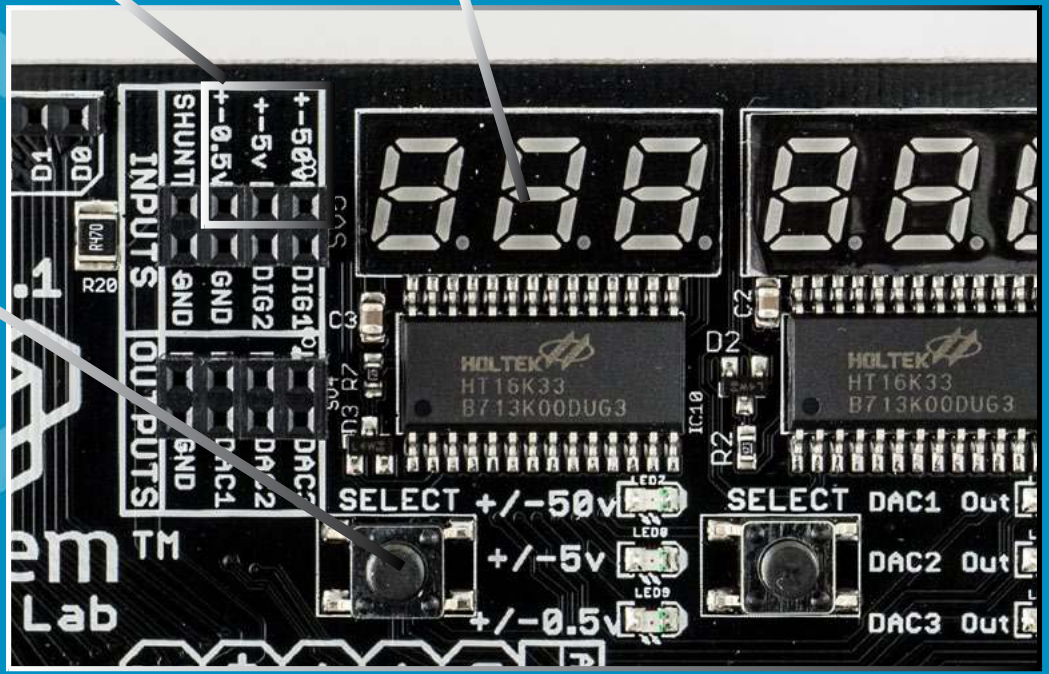
3. Measuring voltages

INPUT HEADER
Patch into these inputs to measure voltages on your breadboards. There are 3 voltage ranges, +/-0.5v , +/-5v and +/-50v.

DISPLAY
The display shows the voltage on the selected input. OBS: When range selected is +/-0.5v, the display shows millivolts. The 2 other ranges shows volts with decimal point.

NEGATIVE VOLTAGES
A special case is when negative voltages is measured. Then the display blinks, this means negative voltages. We made it so, to give more digits to show, instead of using a “-” sign.

SELECT BUTTONS
Selects what the LED displays above will show.



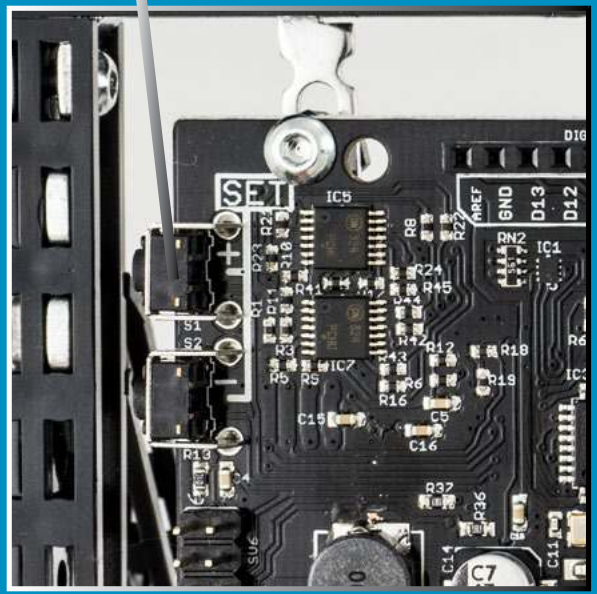
4. Setting the DAC outputs

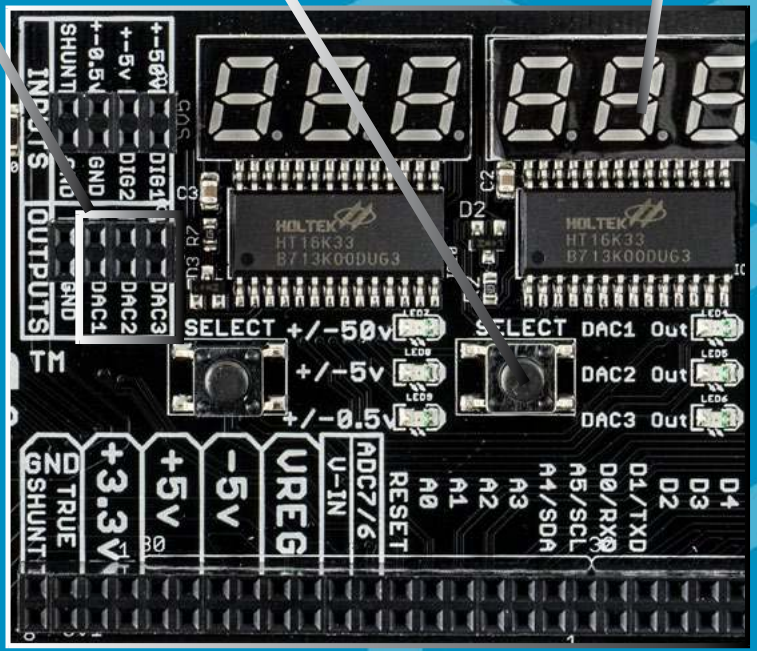
SET-BUTTONS
Use the SET+ and SET- to step up or down to the desired voltage

DAC OUTPUTS HEADER
Patch into these outputs to inject a desired voltage to your circuit. It can output xx mA, in the range 0 to 2.5volts.

SELECT BUTTONS
Selects what which DAC voltage the LED displays above will show. Hold for 2 SEC to go to SET mode. Use the SET+ and SET- to set your desired voltage.

DISPLAY
The display shows the voltage on the selected output.





5. Digital LED indicators , DIG1 and DIG2

DIG1 and DIG 2
Use these 2 inputs to follow a digital signal, input from 3.3v to 5v.

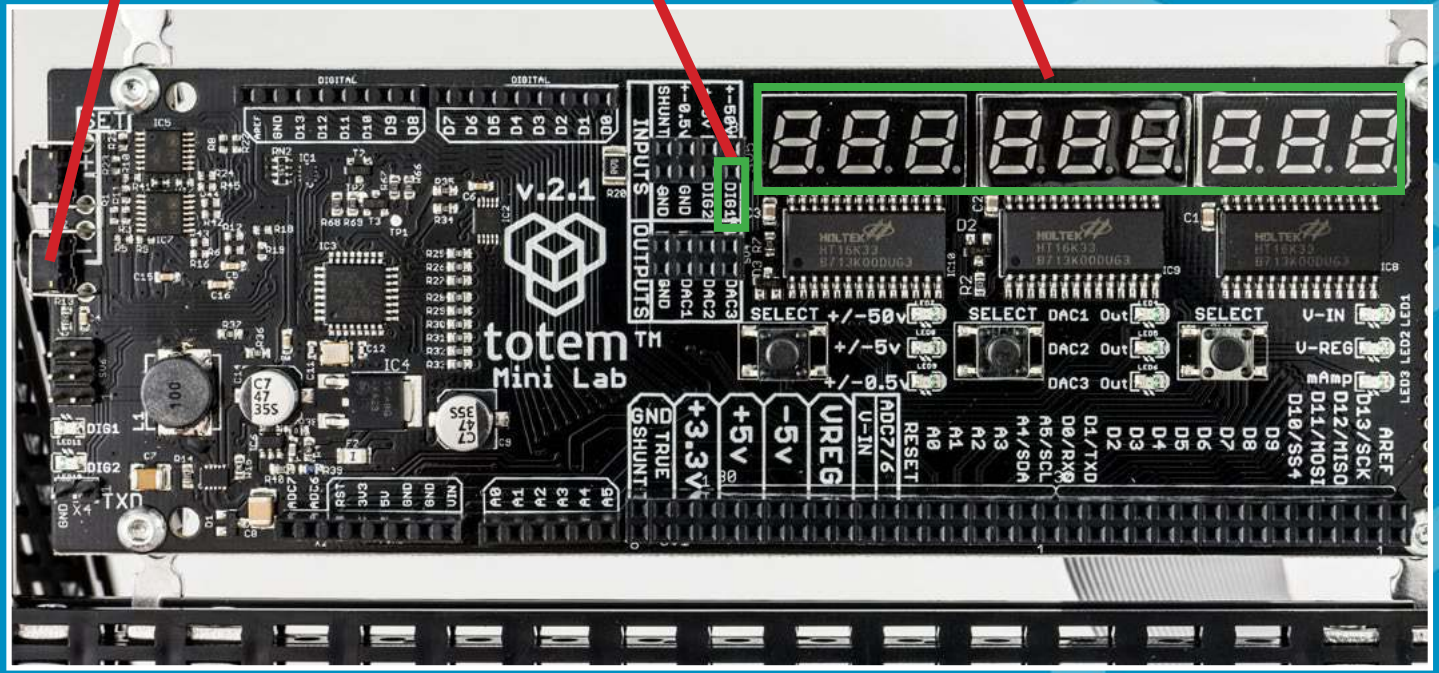
DIG1 and DIG2 LEDs
These 2 LED simply follows the DIG1 and DIG2 inputs, High=Light, Low=Off

6. Frequency measuring

START FREQUENCY MEASURE
Push the STEP- button for a couple of seconds to start and stop frequency measurement.

INPUT DIG1
Use input DIG1 to measure frequency.
It can measure digital signals only, 3.3 to 5volts.

DISPLAY
All 3 displays are used to show frequency. From 0 to approx 750 kHz.



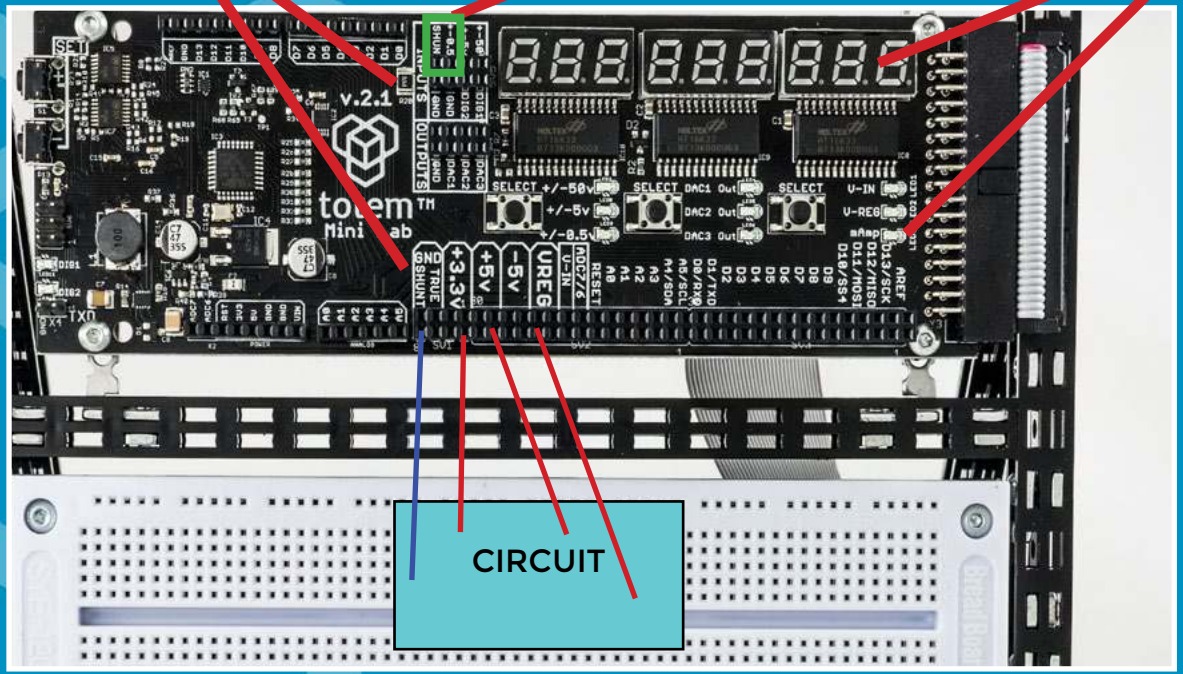
7. Measuring current consumption

RETURN GROUND
If you return all grounds to the LabBoard through the GND SHUNT connector, you can measure the current consumption of your whole breadboard circuit. The SHUNT resistor R20 is then used to measure current.

Connect SHUNT to INPUT +/-0.5 volt. This input then measures the voltage across the SHUNT resistor. (Don't use this input for anything else then.)

DISPLAY #3 will show mAmps

Use the SELECT button so the LED indicates "mAmp"



NOTE:
If you are using some power from the -5volt connector, it's current consumption will in fact be subtracted from the total. It could be misleading sometimes. (The current goes "backwards through the shunt somehow) Normally it will not matter.

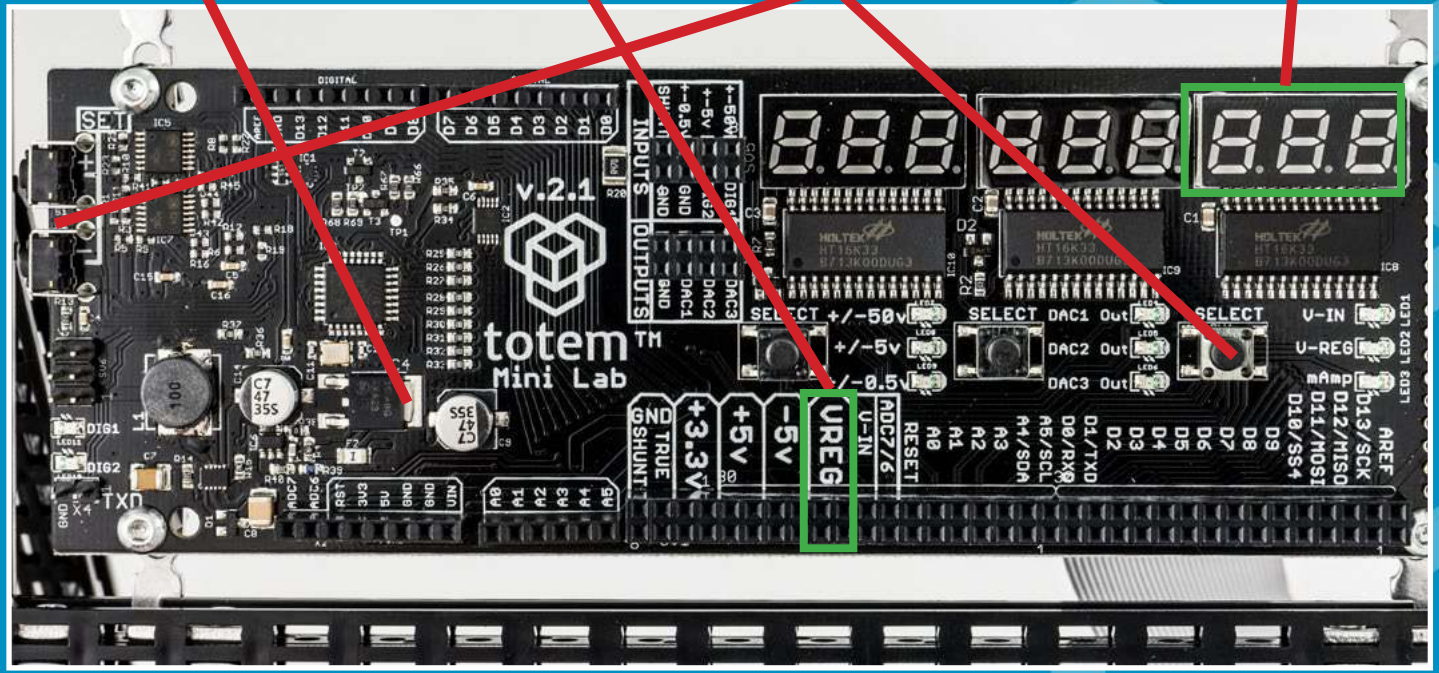
8. Setting the regulated power supply

-VOLTAGE REGULATOR CIRCUIT
This circuit regulates the V-IN to a desired voltage.
Up to 500mA

V-REG HEADER
From this header you can patch the V-REG to your breadboard.

SELECT BUTTON
Step to V-REG and hold button for approx 2 seconds.
Use the SET- and SET+ buttons to set your desired voltage.
Limits: from 3v to V-IN minus 3v

DISPLAY
Shows the V-REG voltage when selected.



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