The IO simulator/trainer is a simple device to demonstrate and test I/O from the robot controller.

It has a row of 8 LEDs that are controlled from the PA output of the controller. This connects to the 15W D connector on the back of the controller.

It has a row of 5 switches that signal back to the PB input of the controller. These connect to the 9 way D connector. Only bits 3-7 are available on that connector so bits 0,1,2 do not have switches.
Note that bits 0,1,2 are used by the robot for calibration. Bits 3 and 4 are also used by the robot for calibration but can be simulated on the trainer.

PB inputs
You can read back these switches with
PP
which displays a row of 1s e.g.
11111111
Push switch PB 7 down and you will see
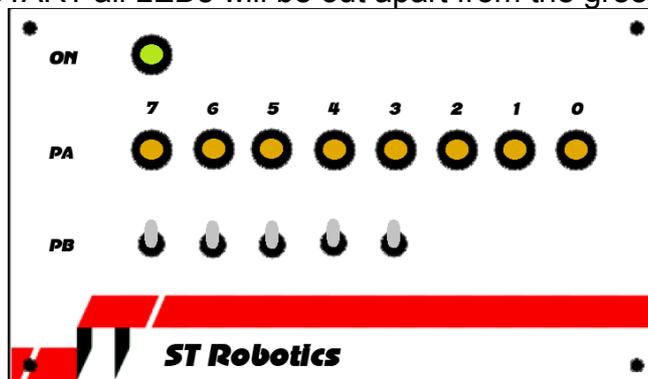01111111
push PB 6 down to see
00111111
switch off PB 7
10111111
and so on.
Press the escape key to return to command OK
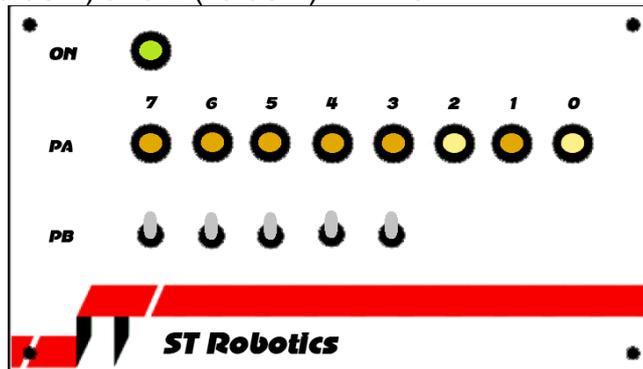
PA Outputs
After you have used START all LEDs will be out apart from the green ON light.

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Now enter
5 PA OUT
In binary, 5 is bits 0 (value 1) and 2 (value 4). 4+1=5.
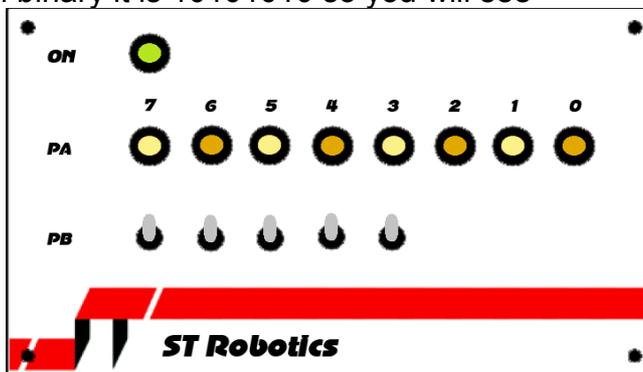

You will see lamps 0 and 2 light.
Enter
HEX AA PA OUT
AA is a hex number. In binary it is 10101010 so you will see

 Enter 0 PA OUT and all the LEDs go out.
To try
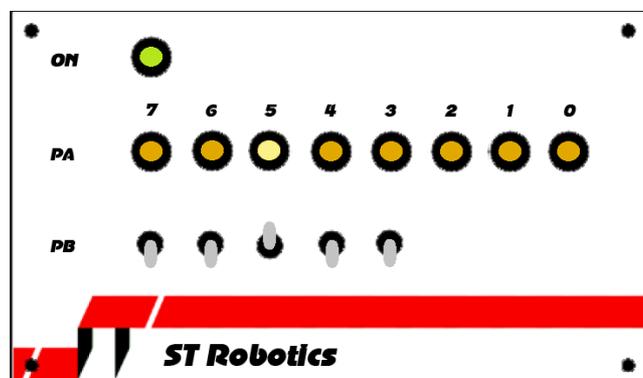You can write a simple program to read PB and output on PA
: TEST1
BEGIN
  PB IN PA OUT
?TERMINAL UNTIL
;
enter TEST1
Now each switch you toggle lights the corresponding LED.

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You can also manipulate the output bit by bit. For example

PA 2 ON
will turn on LED 2
PA 4 ON
will turn on LED 4
now LEDs 2 and 4 are on
PA 2 OFF turns off LED 2
Bear in mind that the gripper is controlled from PA 0 so PA 0 ON will operate the gripper.
Electric grippers are controlled from PA 0 and PA 1 so it is best not to manipulate those two bits.

To flash a LED, for example PA 3:
: TEST2
BEGIN
  PA 3 ON
  500 MSECS
  PA 3 OFF
  500 MSECS
?TERMINAL UNTIL
;
enter TEST2
press esc to exit

Note that while you have the IO trainer plugged into the 15w connector you do not have the pneumatics or other devices connected. For this reason use the supplied ribbon cable extender.

Waiting for input events
PB 7 1 WAIT
This will wait for the PB 7 switch to go to 1 (up). Toggle it up to see OK
PB 7 0 WAIT will now wait for the switch to go down

To try:
Assuming the robot is calibrated and at HOME
: TEST3
BEGIN
   PB 7 BIT? IF
      HOME
   ELSE
       READY
   THEN
?TERMINAL UNTIL
;
try TEST3

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