

Hector M. Diaz



TECNICO ELECTRICISTA



Industrial Electromechanics



Design & Integration
Photovoltaic Systems

1 ; Hector M. Diaz tank controller:temperature and level.

PLC Configuration

Cycle Time (ms):

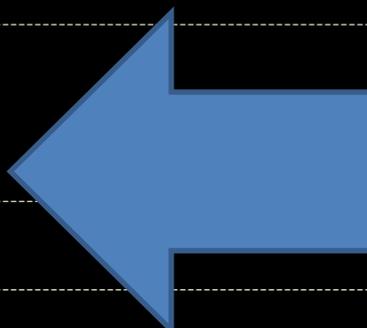
Crystal Frequency (MHz):

UART Baud Rate (bps):

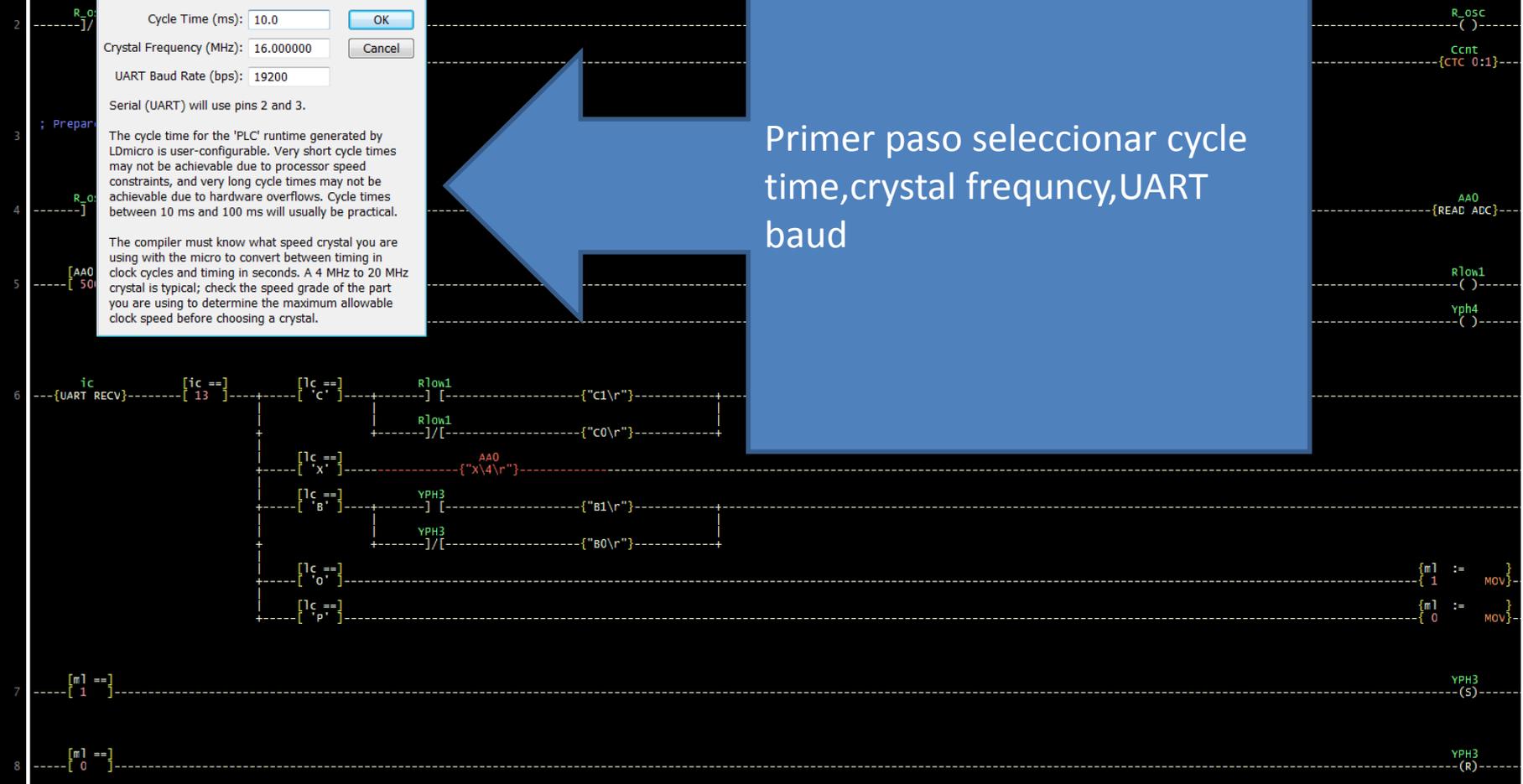
Serial (UART) will use pins 2 and 3.

The cycle time for the 'PLC' runtime generated by LDmicro is user-configurable. Very short cycle times may not be achievable due to processor speed constraints, and very long cycle times may not be achievable due to hardware overflows. Cycle times between 10 ms and 100 ms will usually be practical.

The compiler must know what speed crystal you are using with the micro to convert between timing in clock cycles and timing in seconds. A 4 MHz to 20 MHz crystal is typical; check the speed grade of the part you are using to determine the maximum allowable clock speed before choosing a crystal.



Primer paso seleccionar cycle time, crystal frequency, UART baud



Name	Type	State	Pin on Processor	MCU Port
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Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz



1 ; Hector M. Diaz tank controller:temperature and level.

PLC Configuration

Cycle Time (ms):

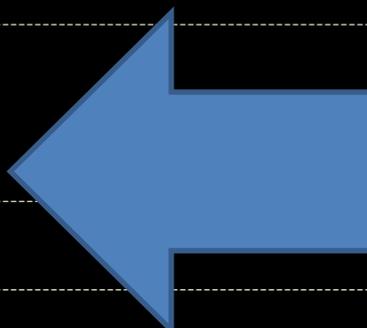
Crystal Frequency (MHz):

UART Baud Rate (bps):

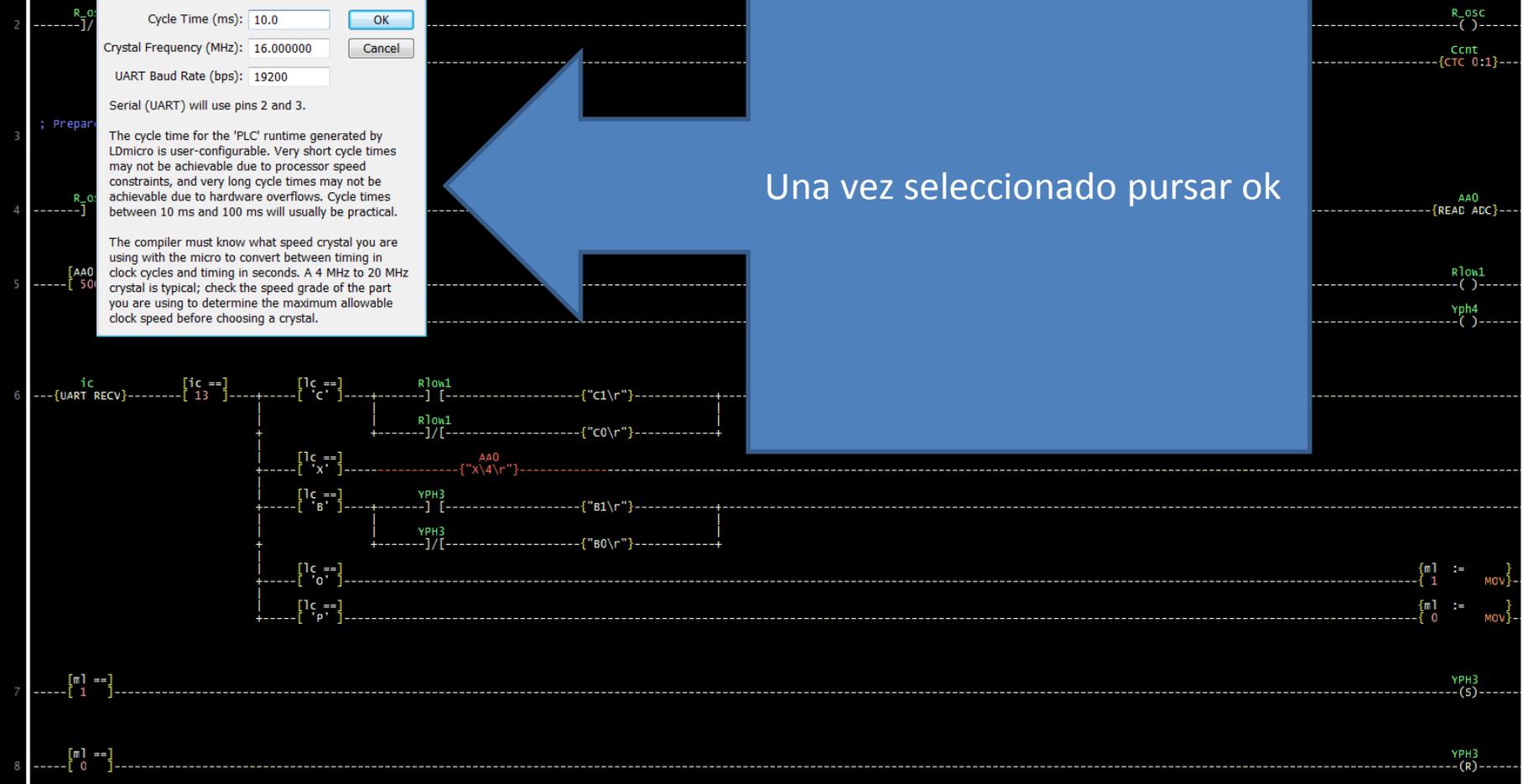
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Una vez seleccionado pulsar ok



Name	Type	State	Pin on Processor	MCU Port
Atmel AVR ATmega2560 100-TQFP	cycle time 10.00 ms			processor clock 16.0000 MHz



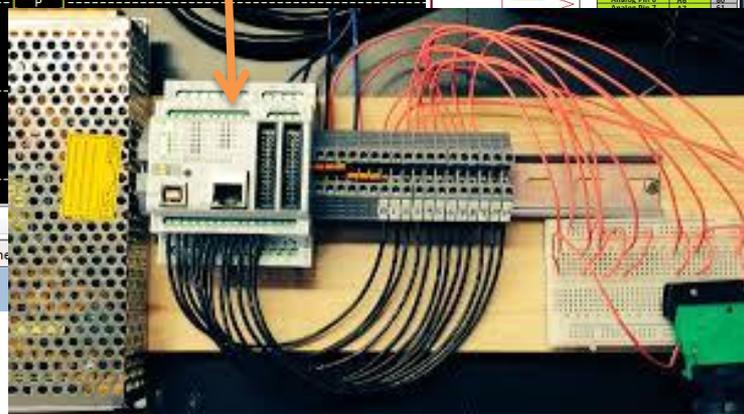
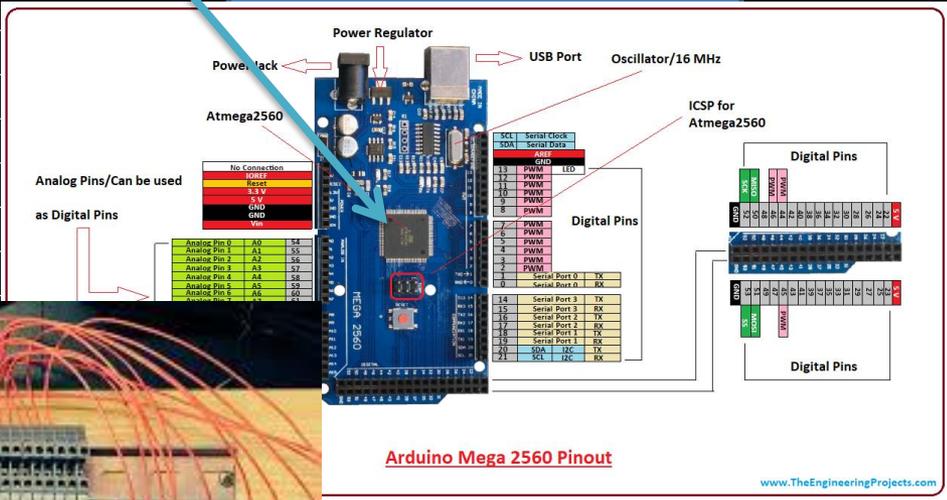
The screenshot shows the LDMicro program editor interface. A dropdown menu is open under the 'Settings' tab, specifically for 'Microcontroller'. The menu lists various microcontroller models, including Atmel AVR ATmega2560, ATmega128, ATmega64, ATmega162, ATmega32, ATmega16, ATmega8, ATmega48, ATmega88, ATmega168, ATmega328, ATmega164, ATmega324, ATmega644, and ATmega1284. Below these are Microchip PIC16F628, PIC16F88, PIC16F819, PIC16F877, PIC16F876, PIC16F887, and PIC16F886. At the bottom of the menu are 'ANSI C Code' and 'Interpretable Byte Code (no microcontroller)'. A blue box with a white arrow points to the menu, containing the text 'Selecciona el microprocesador'. The background shows a ladder logic diagram with rungs 1 through 8, including components like R_osc, TOSC_on, AA0, iC, YPH3, and YPH4.

Name	Type	State	Pin on Processor	MCU Port
Atmel AVR ATmega2560 100-TQFP	cycle time 10.00 ms	processor clock 16.0000 MHz		

MCU Parameters...
Microcontroller

- Atmel AVR ATmega2560 100-TQFP
- Atmel AVR ATmega128 64-TQFP
- Atmel AVR ATmega64 64-TQFP
- Atmel AVR ATmega162 40-PDIP
- Atmel AVR ATmega32 40-PDIP
- Atmel AVR ATmega16 40-PDIP
- Atmel AVR ATmega8 28-PDIP
- Atmel AVR ATmega48 28-PDIP
- Atmel AVR ATmega88 28-PDIP
- Atmel AVR ATmega168 28-PDIP
- Atmel AVR ATmega328 28-PDIP
- Atmel AVR ATmega164 40-PDIP
- Atmel AVR ATmega324 40-PDIP
- Atmel AVR ATmega644 40-PDIP
- Atmel AVR ATmega1284 40-PDIP
- Microchip PIC16F628 18-PDIP or 18-SOIC
- Microchip PIC16F88 18-PDIP or 18-SOIC
- Microchip PIC16F819 18-PDIP or 18-SOIC
- Microchip PIC16F877 40-PDIP
- Microchip PIC16F876 28-PDIP or 28-SOIC
- Microchip PIC16F887 40-PDIP
- Microchip PIC16F886 28-PDIP or 28-SOIC
- ANSI C Code
- Interpretable Byte Code (no microcontroller)

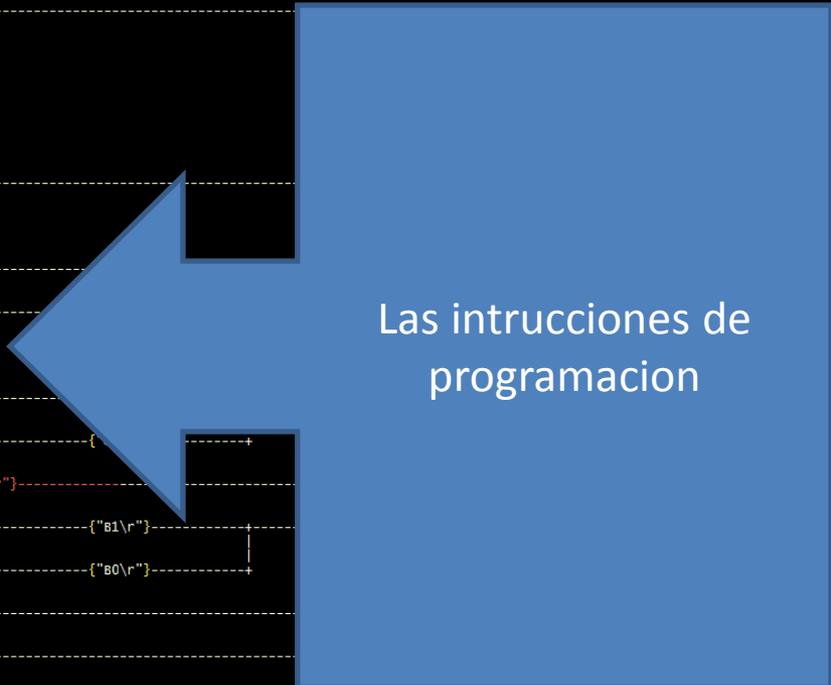
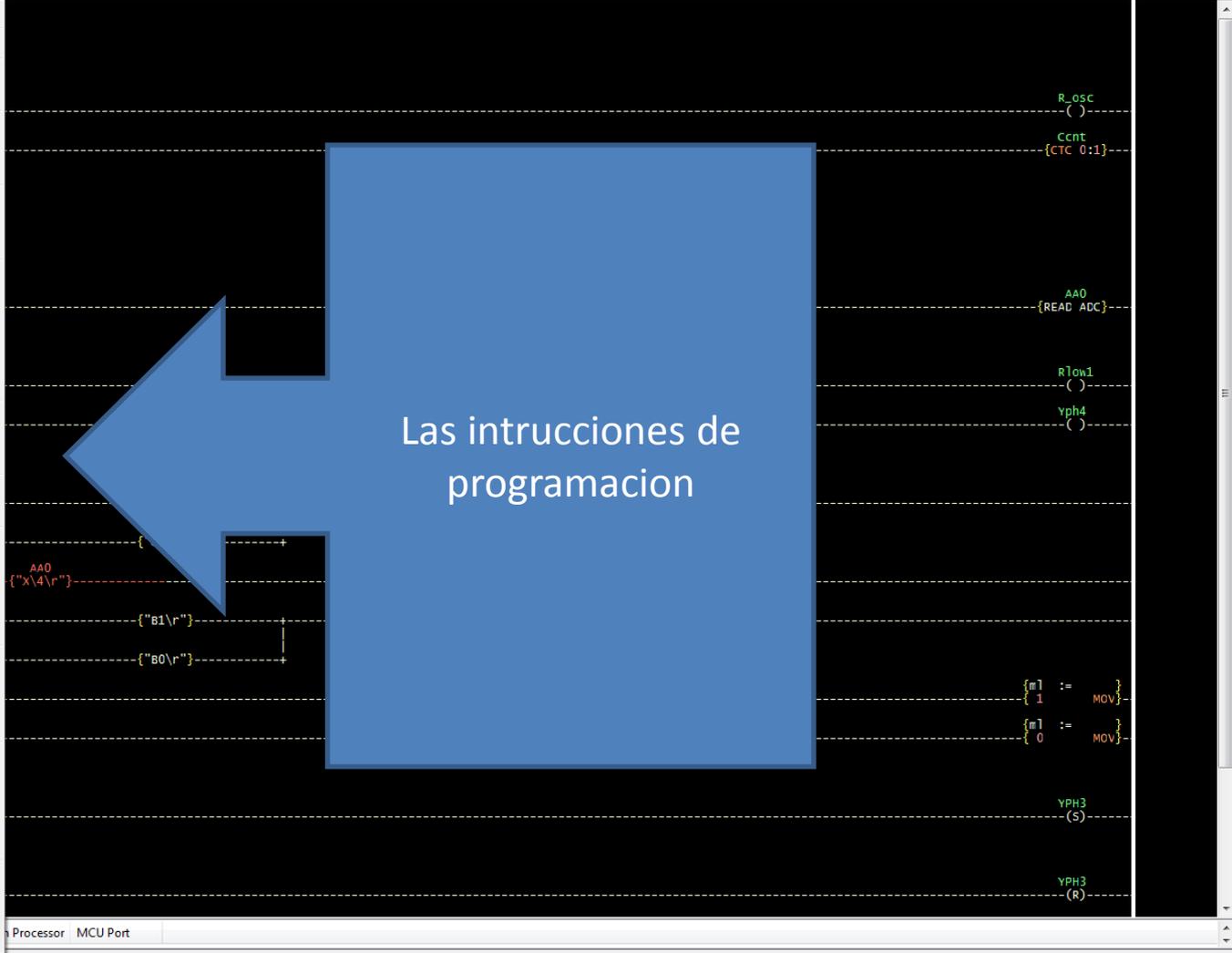
Selecciona el microprocesador



Name	Type
Atmel AVR ATmega2560 100-TQFP	cycle time



1	; Hector M.	Insert Comment	:
		Insert Contacts	C
		Insert OSR (One Shot Rising)	L
2	R_osc	Insert OSF (One Shot Falling)	\
		Insert TON (Delayed Turn On)	O
		Insert TOF (Delayed Turn Off)	F
		Insert RTO (Retentive Delayed Turn On)	T
		Insert CTU (Count Up)	U
3	; Prepare va	Insert CTD (Count Down)	I
		Insert CTC (Count Circular)	J
		Insert EQU (Compare for Equals)	=
4	R_osc	Insert NEQ (Compare for Not Equals)	
		Insert GRT (Compare for Greater Than)	>
		Insert GEQ (Compare for Greater Than or Equal)	.
5	[AA0 >]	Insert LES (Compare for Less Than)	<
	[500]	Insert LEQ (Compare for Less Than or Equal)	.
		Insert Open-Circuit	
		Insert Short-Circuit	
		Insert Master Control Relay	
6	iC	Insert Coil	L
	{UART REC	Insert RES (Counter/RTO Reset)	E
		Insert MOV (Move)	M
		Insert ADD (16-bit Integer Add)	+
		Insert SUB (16-bit Integer Subtract)	-
		Insert MUL (16-bit Integer Multiply)	*
		Insert DIV (16-bit Integer Divide)	D
		Insert Shift Register	
		Insert Look-Up Table	
		Insert Piecewise Linear	
		Insert Formatted String Over UART	
		Insert UART Send	
		Insert UART Receive	
7	[m ==]	Insert Set PWM Output	
	[1]	Insert A/D Converter Read	P
		Insert Make Persistent	
8	[m ==]	Make Normal	A
	[0]	Make Negated	N
		Make Set-Only	S
		Make Reset-Only	R



LDmicro - Program Editor - C:\Users\hdiaz\Desktop\arduino\plc\tanques\hdproject\tanques\hdfinal\tanque.ld

File Edit Settings Instruction Simulate Compile Help

Simulation Mode Ctrl+M
Start Real-Time Simulation Ctrl+R
Halt Simulation Ctrl+H
Single Cycle Space

```
1 ; Hector M. Díaz tank
2 R_osc TOSC_on T_osc_off R_osc
  -)/[-----[TON 100.0 ms]---[TOF 100.0 ms]----- ( )
  Ccnt
  {CTC 0:1}
3 ; Prepare variable
4 R_osc AA0
  [ ] {READ ADC}
5 Row1
  ( )
6 Yph4
  ( )
7 [m] == YPH3
  [ 1 ] (S)
8 [m] == YPH3
  [ 0 ] (R)
```

La parte para simular el proyecto

Name	Type	State	Pin on Processor	MCU Port
Atmel AVR ATmega2560 100-TQFP		cycle time 10.00 ms		processor clock 16.0000 MHz

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LDmicro - Program Editor - C:\Users\hdiaz\Desktop\arduinopl\танques\hdproject\tanques\hdfinal\tanque.ld

File Edit Settings Instruction Simulate Compile Help

Compile F5
Compile As...

1 ; Hector M. Diaz tank control]

2 R_osc TOSC_on T_osc_off
---]/[---[TON 100.0 ms]---[TOF 100.0 ms]

3 ; Prepare variable

4 R_osc
---] [---

5 [AA0 >]
[500]

6 ic == [ic ==] [ic ==] Rlow1 [ic ==] ["c1\r"]
---[UART_RECV]---[13]---[c']---] [--- ["c0\r"]
Rlow1
["X\r"] AA0
["B\r"] YPH3 ["B1\r"]
["O\r"] YPH3 ["B0\r"]
["P\r"]

7 [m1 ==] YPH3 (S)

8 [m1 ==] YPH3 (R)

Arduino Mega-1

New x1 prototipetank.ld x

```
1 LDmicro0.1
2 MICRO=Atmel AVR ATmega2560 100-TQFP
3 CYCLE=10000
4 CRYSTAL=16000000
5 BAUD=19200
6 COMPILED=D:\hdproject\tanques\hdfinal\tanque eje.hex
7
8 IO LIST
9 YPH3 at 15
10 Yph4 at 16
11 AA0 at 97
12 END
13
14 PROGRAM
15 RUNG
16 COMMENT Hector M. Diaz tank controller:temperature and level.
17 END
18 RUNG
19 CONTACTS R_osc 1
20 TON Tosc_on 100000
21 TOF T_osc_off 100000
22 PARALLEL
23 COIL R_osc 0 0 0
24 CTC Cont 1
25 END
26 END
27 RUNG
28 COMMENT Prepare variable
29 END
30 RUNG
31 CONTACTS R_osc 0
32 READ_ADC AA0
33 END
34 RUNG
35 GRT AA0 500
36 PARALLEL
37 COIL Rlow1 0 0 0
38 COIL Yph4 0 0 0
39 END
40 END
41 RUNG
42 UART_RECV ic
43 EOU ic 13
Ready
File: D:/tanques/hdproject/tanques/prototipetank.ld
```

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz

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Salvar en .hex

El programa de (lader) lo convierte en language (C)



Estos son los comando de preparacion de osilacion

Name	Type	State	Pin on Processor	MCU Port
------	------	-------	------------------	----------

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz



```
1 ; Hector M. Diaz tank controller:temperature and level.
```

```
2 R_osc ( )
   [TON 100.0 ms]
   [TOF 100.0 ms]
```

```
3 ; Prepare variable
```

```
4 R_osc ( )
```

```
5 [AA0 >]
   [500]
```

```
6 {UART_RECV}
   [ic ==]
   [13]
```

```
   [ic ==]
   [ 'B' ]
   [ "B1\r" ]
   YPH3
   [ic ==]
   [ '0' ]
   [ "B0\r" ]
   YPH3
```

```
7 [m1 ==]
   [ 1 ]
   {m1 :=}
   [ 1 := MOV }
```

```
8 [m1 ==]
   [ 0 ]
   {m1 :=}
   [ 0 := MOV }
```

Name	Type	State	Pin on Processor	MCU Port
YPH3	digital out		15	PH3
Yph4	digital out		16	PH4
AA0	adc input		07	PF0
ic	UART rx		2	
R_osc	int. relay			
Rlow1	int. relay			
Tosc_on	turn-on delay			
T_osc_off	turn-off delay			
Ccnt	counter			
lc	general var			
ml	general var			

La entrada analoga

Name	Type	State	Pin on Processor	MCU Port
AA0	adc input		07	PF0



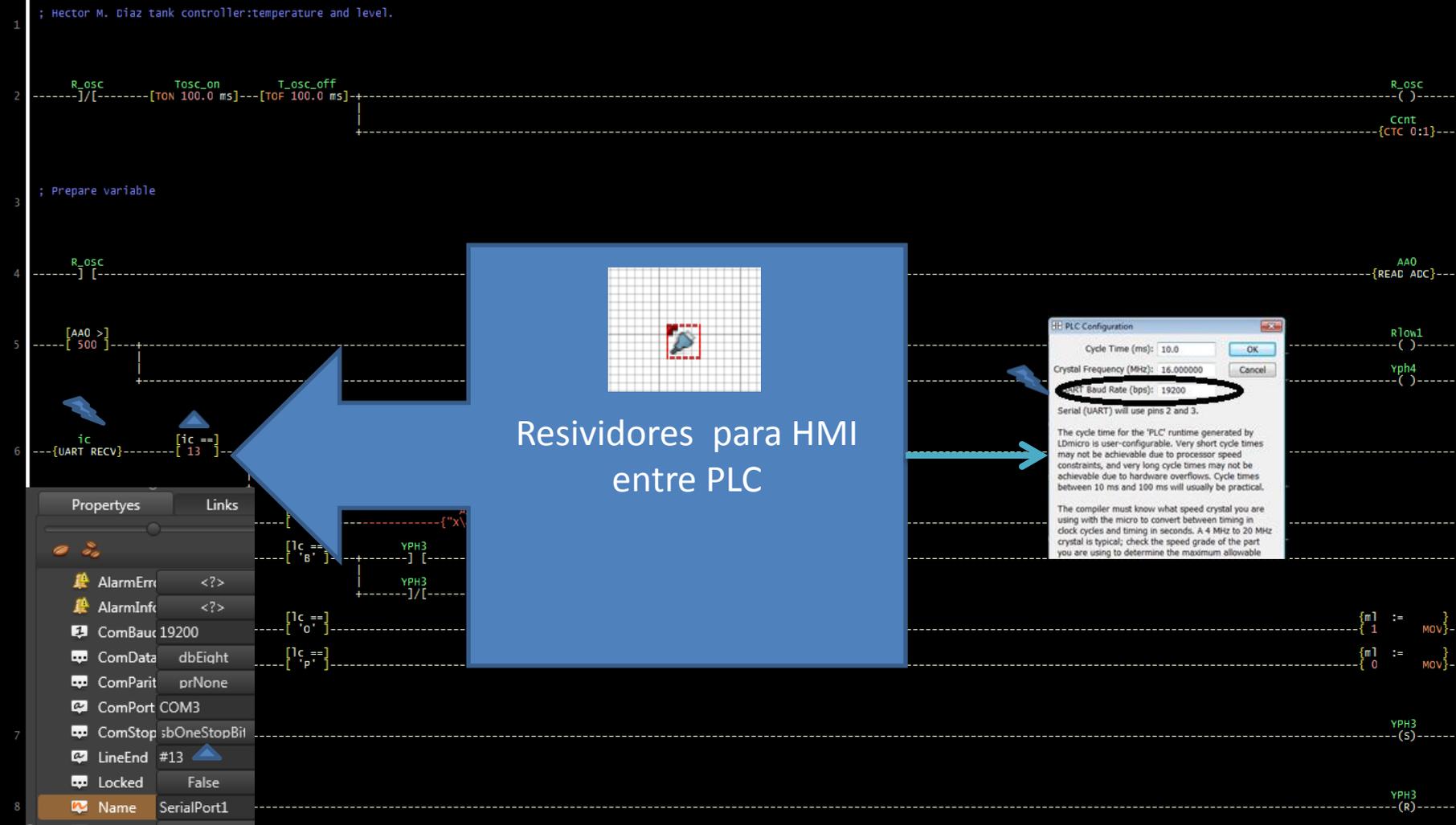
La accion logica de la entrada analoga

Name	Type	State	Pin on Processor	MCU Port
------	------	-------	------------------	----------

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz



Quando pasa 500 se activan la salida de los coil externo y interno



Resividores para HMI
entre PLC

LDmicro - Program Editor - C:\Users\hdiaz\Desktop\arduino\plc\tanques\hdproject\tanques\hdfinal\tanque.ld

File Edit Settings Instruction Simulate Compile Help

```
1 ; Hector M. Diaz tank controller:temperature and level.
2
3
4
5
6
7
8
```

Properties Links

- Name LZTag2
- Position <TPosition>
- ReadType rtAlways
- Remote: C
- Value

Los tag del plc que conectan con HMI

Storage1

- LZClient1 ↔ SerialPort1
- CheckBoxP1 ↔ SerialPort1
- LZTag1 ↔ DigitalIN1
- LZTag2 ↔ LedP2
- LZTag1 ↔ GaugeL1

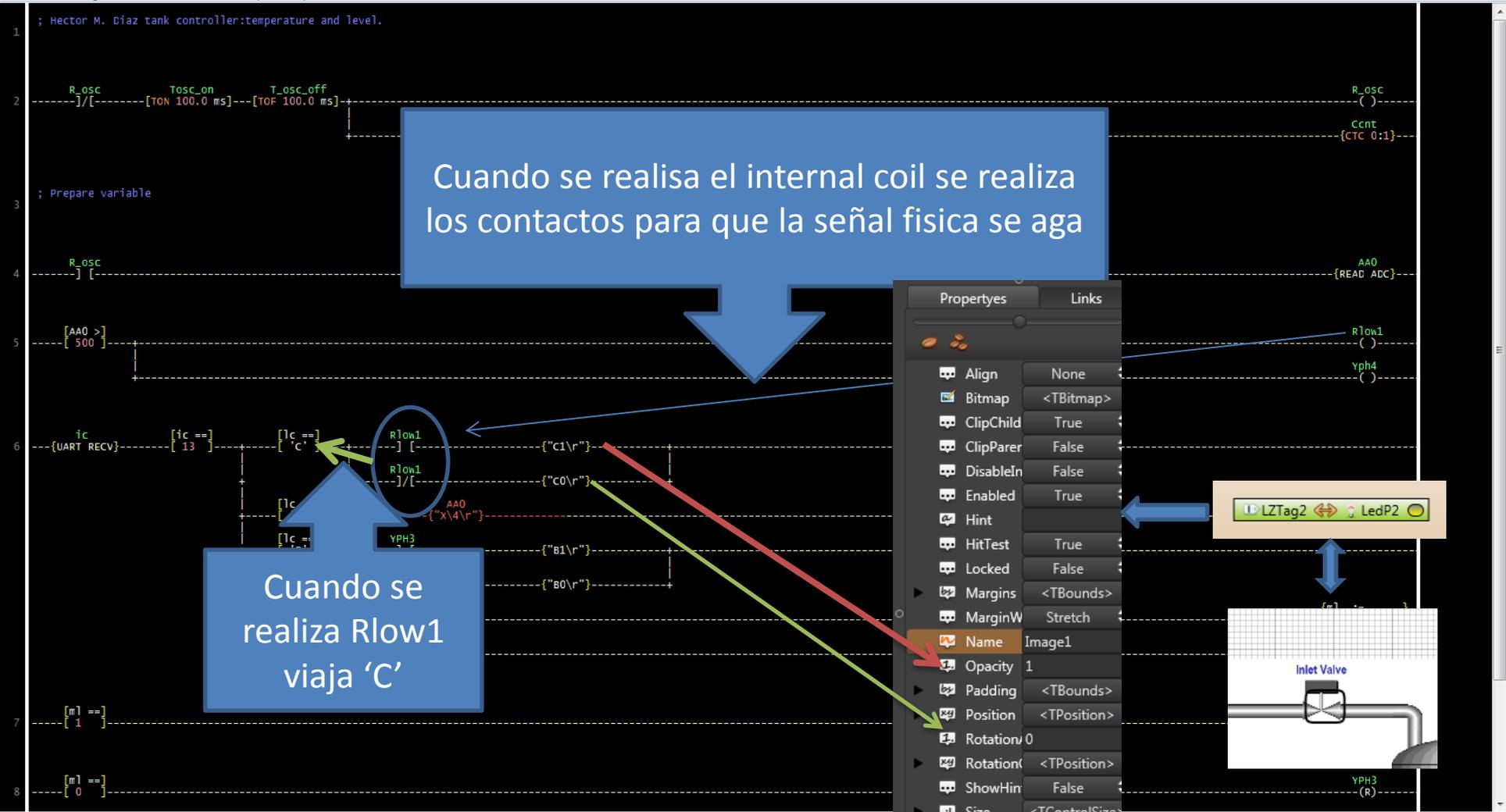
Properties Links

- Name LedP2
- OffPath <?>
- OffValue 0
- OnPath <?>
- OnValue 1
- Opacity 1
- ShowHint False
- Size <TControlSize>
- Stroke <TStrokeBrush>
- Value
- Visible True

PLC Program for Tank Heating Control using Hector M. Diaz

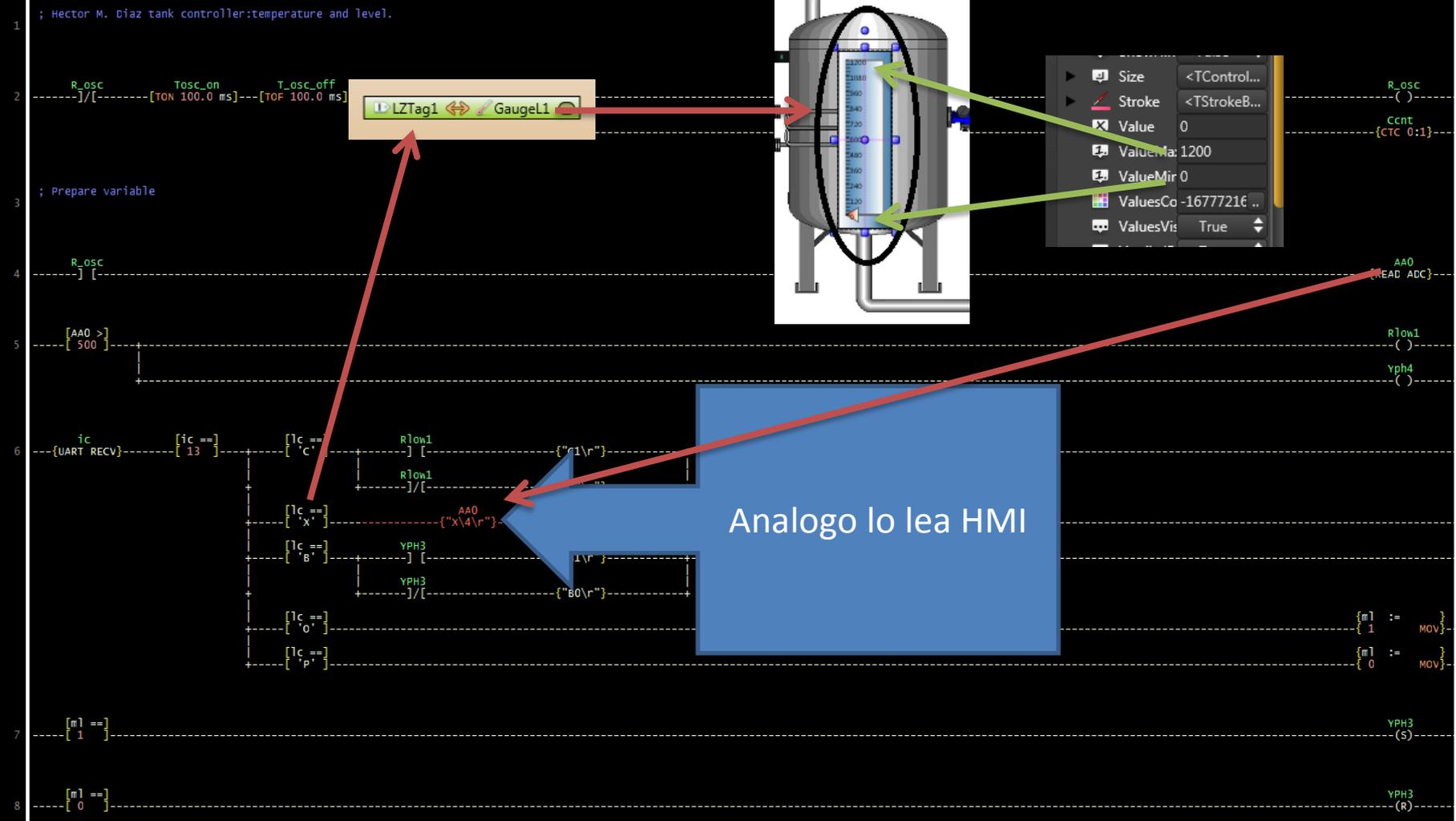
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Name	Type	State	Pin on Processor	MCU Port
Atmel AVR ATmega2560 100-TQFP		cycle time 10.00 ms	processor clock 16.0000 MHz	

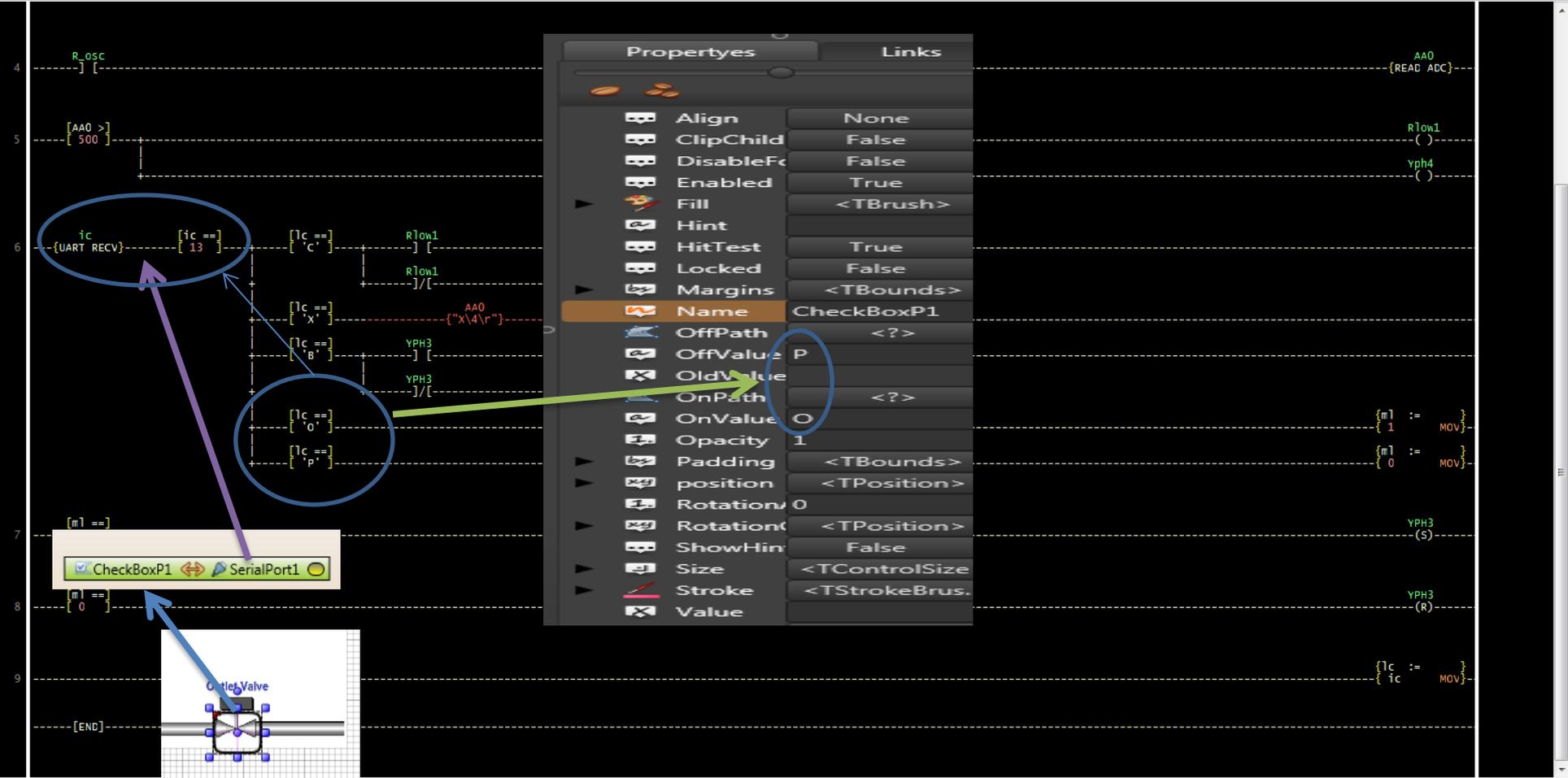


Cuando se realiza el internal coil se realiza los contactos para que la señal fisica se aga

Cuando se realiza Rlow1 viaja 'C'

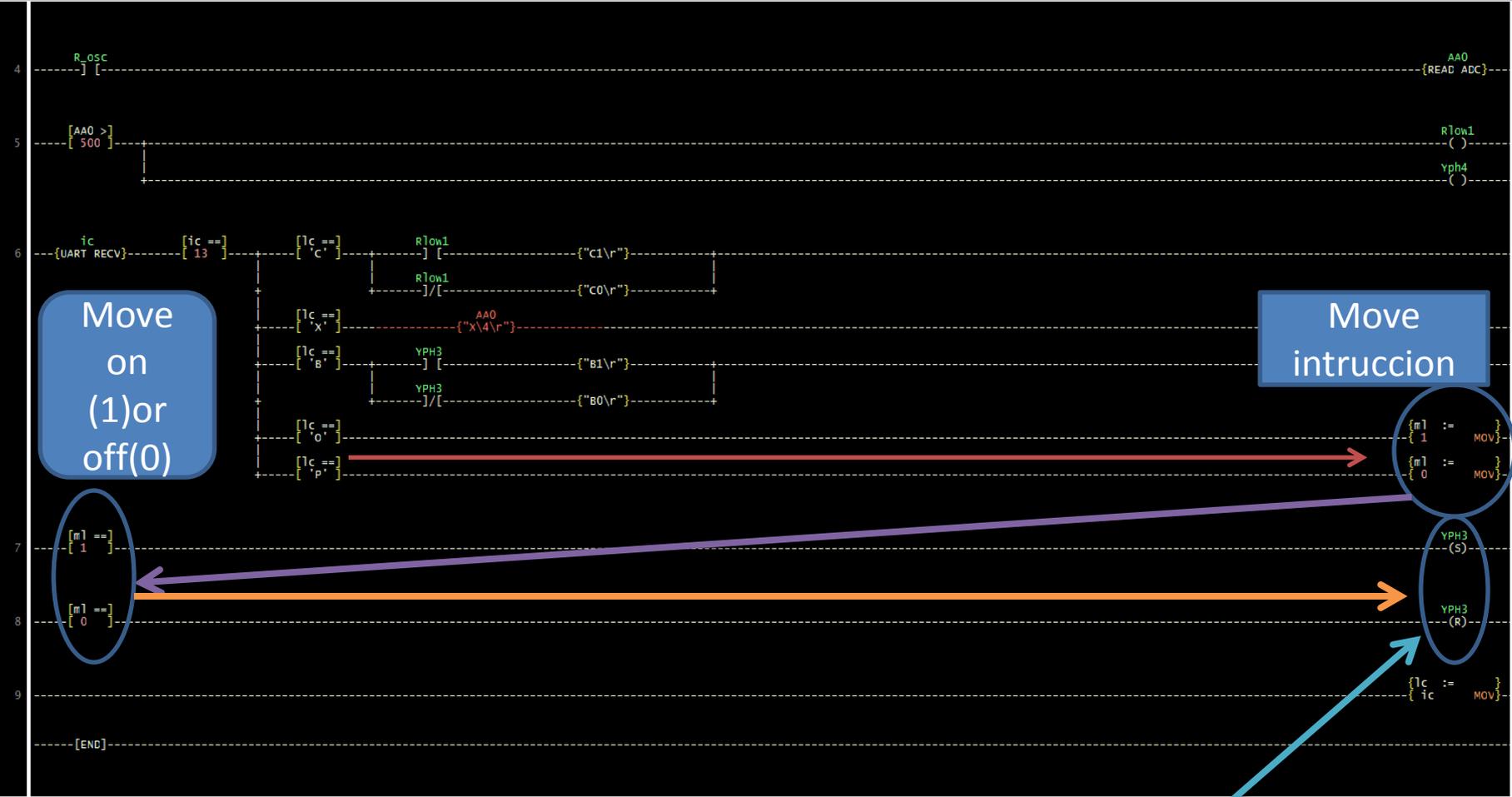


Analogo lo lea HMI



Name		Pin on Processor	MCU Port
YPH3	digital out	15	PH3
Yph4	digital out	16	PH4
AA0	adc input	97	PF0
ic	UART rx	2	

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz



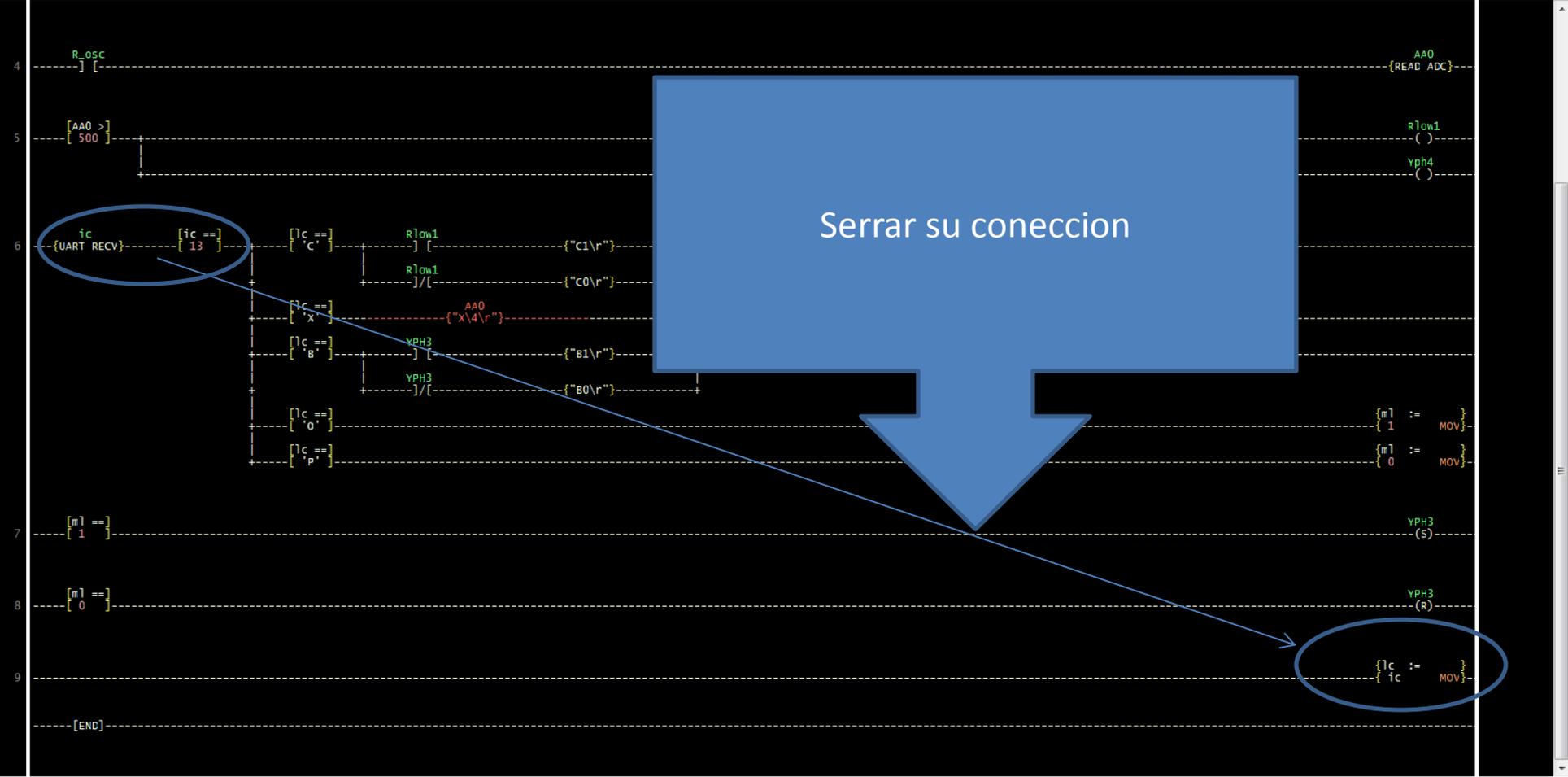
Move on (1) or off (0)

Move intruccion

Name	Type	State	Pin on Processor	MCU Port
YPH3	digital out		15	PH3
Yph4	digital out		16	PH4
AA0	adc input		97	PF0
ic	UART rx		2	

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz

Out put coil for relay



Serrar su coneccion

Name	Type	State	Pin on Processor	MCU Port
YPH3	digital out		15	PH3
Yph4	digital out		16	PH4
AA0	adc input		97	PF0
ic	UART rx		2	

Atmel AVR ATmega2560 100-TQFP cycle time 10.00 ms processor clock 16.0000 MHz