

# YAPSC : 10V

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*Quickstart Guide*

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# 1 Before you start

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## 1.1 Intro

Configuring your servo board for each hardware can be a hassle. There are many ways to make a mistake that will create a hard-to-find error. Here is the step by step procedure to correctly wire and configure your YAPSC:10V board. Most steps explain the expected result, so you can easily spot and correct any mistakes you could have made. Do not skip any steps, check to make them completely before going to the next step. Stop on the first erroneous step. If you cannot solve the problem, report your actions, the behavior of the board, and the number of the erroneous step number. **Remember any machine can be dangerous, so skipping or partially making one step can be fatal for you or your machine!**

## 1.2 Prerequisite

- [YAPSC:10V manual](#)
- [ProgKey manual](#)
- USB ProgKey's drivers are installed (read the manual)

You will need:

- 5V or 7 to 16V (300mA) Power supply
- +12V/-12V (40mA) Power supply
- One servo amp
- One servomotor
- A computer with
  - USB port
  - Parallel port (for EMC/MACH3) or a STEP/DIR interpolation card (SmoothStepper, Pluto board, MESA's Anything IO, ...)
  - Hyperterminal (or any other serial terminal emulator like [Termite](#))
  - Ingenia Bootloader installed

# 2 The procedure

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1. Download and extract <http://max-mod-shop.com/media/yapsc10v/YAPSC.10V.zip> in a folder we'll call "YAPSC.10V".
2. Download and extract your ProgKey's manual
  1. USB ProgKey : [http://max-mod-shop.com/media/usbprogkey/USB\\_ProgKey.zip](http://max-mod-shop.com/media/usbprogkey/USB_ProgKey.zip) in a folder we'll call "ProgKey"
3. disconnect everything to YAPSC except power supply (both digital and analog power). +5V, +12V and -12V LEDs should be bright green.
4. connect the progKey.
5. cut YAPSC's power off.
6. run ingenia bootloader, select the line "USB serial port (COMx)", 38400bps, note the COM port number (x), and click configuration done.
  1. If the line "USB serial port (COMx)" does not appear in the combobox, you have to uninstall and reinstall the ProgKey

2. If multiple ports are available, try all of them. Only one of them allows you to pass step 8.
7. Click "OK, my platform is shut down"
8. Now yellow LED on your ProgKey should be blinking.
9. Power the board ON. +5V LED should be bright green.
10. Now, Ingenia should have detected your board.
11. Next step is to open HEX file "YAPSC.10V\r2\hex\dspic-servo.hex"
12. click "start write"
13. Once the progress bar is completed, you will see "dsPIC write process completed" in the "log viewer"
14. quit ingenia, and open "ProgKey\9600.ht" with hyperterminal.
15. close the port and change the port setting (read "ProgKey/USB ProgKey Manual-en.pdf" section 4.2 on pages 8-9), select the COM port number from step 6.
16. open the com port
17. Hyperterminal's window should show something like that:

```
dspic-servo by L.Glaister
10V mod by MaX-MoD
Using setup from eeprom.. ? for help

Current Settings:
servo enabled = 0
(p) = 0.000000
(i) = 0.000000
(d) = 0.000000
FF(0) = 0.000000
FF(1) = 0.000000
dead(b)and = 1.000000
(m)ax Output = 95.00%
(f)ault error = 1000.000000
(x)pc cmd multiplier = 1
(t)icks per servo cycle= 2
using 0.200000ms servo loop interval
```

18. type 'e' and hit ENTER key in hyperterminal. you should see "encoder = 0x0000 = 0"
19. Now connect then encoder to YAPSC
20. turn the motor's shaft 1/4 turn
21. type 'e' and hit ENTER key in hyperterminal. you should see "encoder = 0xxxxx = V" with V approximatively equal to your encoder's number of lines (plus or minus)
22. turn the motor's shaft 1/2 turn in the other way
23. type 'e' and hit ENTER key in hyperterminal. you should see "encoder = 0xxxxx = W" with W ~= -V
24. Apply 5v to the "ENABLE" input. Do not forget you need to apply the +5V on the block noted '+' and to apply mass at the other block!
25. type 'l' and hit ENTER key in hyperterminal. You should see

```
Current Settings:
servo enabled = 1
etc.
```

26. Type 'p0.1' and hit ENTER key in hyperterminal. You should see

```
Current Settings:
servo enabled = 1
```

(p) = 0.10000

27. place K3 strap in 1-2 position
28. Now if you turn the encoder's shaft, you will see the output voltage on 'CMD' output raise or lower when you turn the shaft.
29. If you turn the encoder's shaft more than 250lines, ERR led will blink red and CMD output will be 0V.
30. power the board OFF, wait for the +5V LED to turn completely dark and then power the board ON again. Similar text than step 17. message should appear once again.
31. Now, make some pulses on the DIR input. (do not forget you need a mass and a +5V for each STEP, DIR or ENABLE input)
32. type 's' and hit ENTER key in Hyperterminal. you should see

```
Servo Loop Internal Calcs:  
command: X  
feedback: 0  
etc.
```

X is the number of pulses you have made ( if you use a wire or switch, X can be far bigger than the number of pulses you have made, which is normal). X should be positive

33. Apply 5V to the DIR input, and repeat steps 31.&32.. X should have diminished
34. power the board OFF, wait for the +5V LED to turn completely dark and then power the board ON again. Similar text than step 17. message should appear once again.
35. Now type 'p0.001' and hit ENTER key in hyperterminal. Type 'i0.0001' and hit ENTER key in hyperterminal. For high count (>1000lines) count encoders, type 'p0.0001' and 'i0.00001' instead Connect the CMD output to your servo amp and then enable your servo amp. There are two possibilities:
  1. the servo goes straight in one direction at high speed, and then ERR led blinks : you have to swap A and B encoder leads OR use negative PID parameters (ex: 'p-0.001'). Then restart from step 34. If the result is the same in both cases, verify that the amp is working correctly.
  2. The servo stabilises in one position : fine, you can start tuning the PID parameters!
36. connect your parallel port (or interpolation card) to the STEP, DIR and ENABLE inputs.
37. check the settings in MACH/EMC... and launch a test : you're done!

### 3 Stuck?

If you got stuck on a step, possible mistakes and solutions can be found in the the following tips.

- 1.&2. The YAPSC:10V page can be found here : [http://max-mod-shop.com/index.php?option=com\\_content&view=article&id=47](http://max-mod-shop.com/index.php?option=com_content&view=article&id=47). You will find links to the stated documents.
- 3. Okay, so you have troubles wiring the power supply, right? Let's try this:
  - Download one of the examples you will find here : [http://max-mod-shop.com/index.php?option=com\\_content&view=article&id=47](http://max-mod-shop.com/index.php?option=com_content&view=article&id=47)
  - like : <http://max-mod-shop.com/media/yapsc10v/COPLEY503-MCG2128.pdf>
  - or : [http://max-mod-shop.com/media/yapsc10v/Siedel\\_Digifas\\_7200.pdf](http://max-mod-shop.com/media/yapsc10v/Siedel_Digifas_7200.pdf)
- 4. PC interface connector is the 10 pins IDC connector "**P3**". Matching ICD connector is present on the ProgKey. A finger prevents you from reversing the plug.
- 5. You have to remove the digital power input (either switch OFF the PSU or remove cables). If the "**+5V**" LED is dark, power is removed.  
The +12V and -12V power inputs don't need to be removed as it is not providing power to the dsPIC chip.

- 6. Ingenia Bootloader runs **only** under Windows. The installer file is "progkey/bootloader/IBLInstaller.exe". Read the ProgKey's manual in case of doubt.
- 8. If not :
  - You have chosen the wrong COM port. Try with another one.
  - OR Windows failed to load the driver. Reboot may be required
  - If none of the two previous solutions have worked, the ProgKey is probably dead.
- 10. If not:
  - check YAPSC:10V board's power : +5V LED should be bright green
  - check the connection between YAPSC:10V and the ProgKey : is the IDC plug completely plugged?
- 13. If programming fails:
  - retry
  - Restart from step 6. and choose "**9600bps**"
    - if it still fails, check all connection, and check that the power supply gives enough power tot the board, and that +5V voltage is OK ( $4.5V < +5V < 5.5V$ , continuous, without spikes...)
- 14. Open Termite's configuration file ("termite.ini" in Termite's installation directory) with Notepad, replace configuration with:

```
[Settings]
Port=4
Baud=9600
DataBits=8
StopBits=1
Parity=0
Handshake=0
ForwardPort=0
[Options]
LocalEcho=0
AppendLine=3
LogFile=
Monospaced=1
WordWrap=0
ImmediateMode=0
CloseOnCancel=1
Topmost=0
```

- and open the COM port
- 18.
  - Nothing appears on the terminal:
    - check any false connection
    - check the port number
    - check the port is open
  - Erroneous characters appear :
    - check the connections
    - check the port's speed (9600bps)
- 19. More details about the wiring in YAPSC:10V's manual.
- In the case you cannot turn motor's (encoder's) shaft, wire & plug the encoder cable and go to step 24.

**Note that a possible cause of step 35. can now be the encoder wiring!**

- 28. If not, check
  - that +5V is present on the ENABLE input
  - that nothing is wired on the FAULT input
- 29. Maximum error fault can be tweaked from 0 (disabled) to 32768. Use the “I” command to choose the maximum you want.
- 35. If the motor vibrates rapidly, you should reduce P, I and D gains.

## 4 Annex

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### 4.1 YTT (YAPSC Tuning Tool)

YTT is currently under development and has no web page. Check the [YAPSC:10V](#) tread for latest news.

### 4.2 YAPSC

The first version of YAPSC is a DC servomotor controller equipped with a power stage.

Links:

- Original tread on the French forum usinages.com : [www.usinages.com/carte-servos-a-dspic-t648.html](http://www.usinages.com/carte-servos-a-dspic-t648.html)
- YAPSC-related stuff on my web page (French) : [http://max-mod-shop.com/index.php?option=com\\_content&view=category&id=17:-yapsc&Itemid=4&layout=default](http://max-mod-shop.com/index.php?option=com_content&view=category&id=17:-yapsc&Itemid=4&layout=default)
- dspic-servo tread on cnczone.com : <http://www.cnczone.com/forums/showthread.php?t=40940>

### 4.3 dspic-servo

This is the original work from Lawrence Glaister I based YAPSC on. It is located at <http://www.members.shaw.ca/swstuff/dspic-servo.html>

### 4.4 License

Unless specified, the project files are released under GPL3. Read the included file [gpl-3.0-standalone.html](#)

This manual is NOT under GPL, I (Charles-Henri Maximilien MOUSSET) reserve all right on it. Copying or modifying in any way (partially or entirely) this manual's content is forbidden unless I explicitly authorize you to do so.

You can freely distribute this manual under the same condition, unmodified and without any material of financial compensation.

### 4.5 Contact

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PM “MaX-MoD” on usinages.com

## Document revs.

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