PD-109

High power stepper motor motion system

You will need

- Your PD-109 stepper motor controller and driver module
- Interface (RS232 or RS485) with cables and maybe converter supplied.
- Step / Direction generator (+5V /0V output)
- DC Power supply in the range 24V to 48V
- TMCL-IDE program, PC

Precautions

- Do not reverse the power supply polarity – module could be destroyed!
- Do not connect or disconnect the motor while powered
- Do not mix up connections or short-circuit pins
- Avoid bundling IO wires with motor power wires, as this may cause noise pickup from the motor.
- Do not exceed the maximum power supply of 55V.

### Starting up:

Start with power supply OFF.

1. Interfaces: Either use RS232 directly from PC or RS485 with a converter (add termination network and set telegram pause time if necessary). See the figure on the right for pinning.
2. Tie IF_select to GND to use RS485, leave open for RS232.
3. Connect power supply to TMCM-109
4. Turn power ON. The LED of the module lights and the motor is powered (standby current flows) but in standstill. *If this does not occur switch power OFF and check your connections and power supply.*
5. Start the TMCL IDE program (see other side of the sheet how to configure the connection and use the IDE).
6. Type following into the open window:

```
//A simple example for using TMCL and the TMCL-IDE
      SAP 4, 0, 100         //Set the maximum speed
Loop: MVP ABS, 0, 15000     //Move to position 15000
      WAIT POS, 0, 0
      WAIT TICKS, 0, 200
      MVP ABS, 0, 0         //Move back to position 0
      WAIT POS, 0, 0
      WAIT TICKS, 0, 100
      JA Loop               //Infinite Loop
```

7. Click the "*Assemble*" icon, then click the "*Download*" icon to download the code to the TMCM-110. Click the "*Run*" icon. The downloaded program will now be executed
8. Click stop button and start "TMCL Direct Mode" to issue following commands:
   - ROR rotate right, Motor 0, value 500   Click Execute
     The motor is rotating now.
   - MST motor stop, Motor 0   Click Execute
9. Connect a step / direction generator and try different velocities and directions. Note that some TMCL parameters influence this operation like microstep resolution.
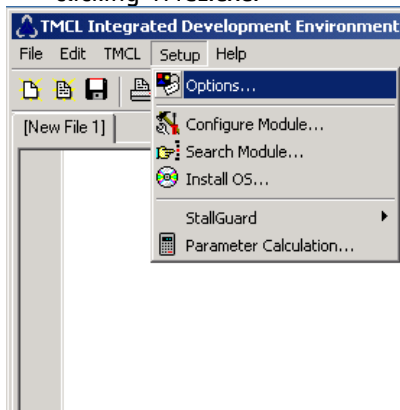
First steps are made. For other commands of the PD-109 refer to next page and the PD-109 Manual.
Wiring note: The PD-109 has screw terminal connectors only. These allow very easy connection of all in- and outputs.
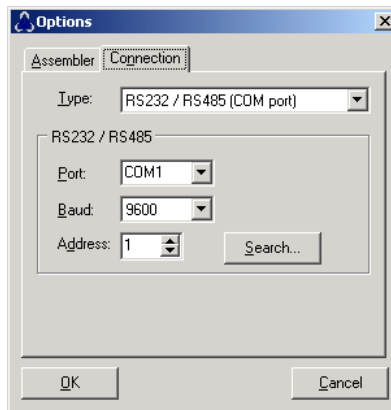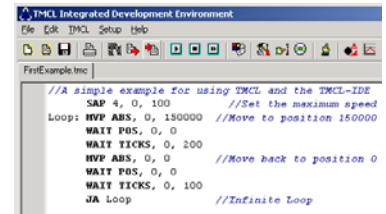

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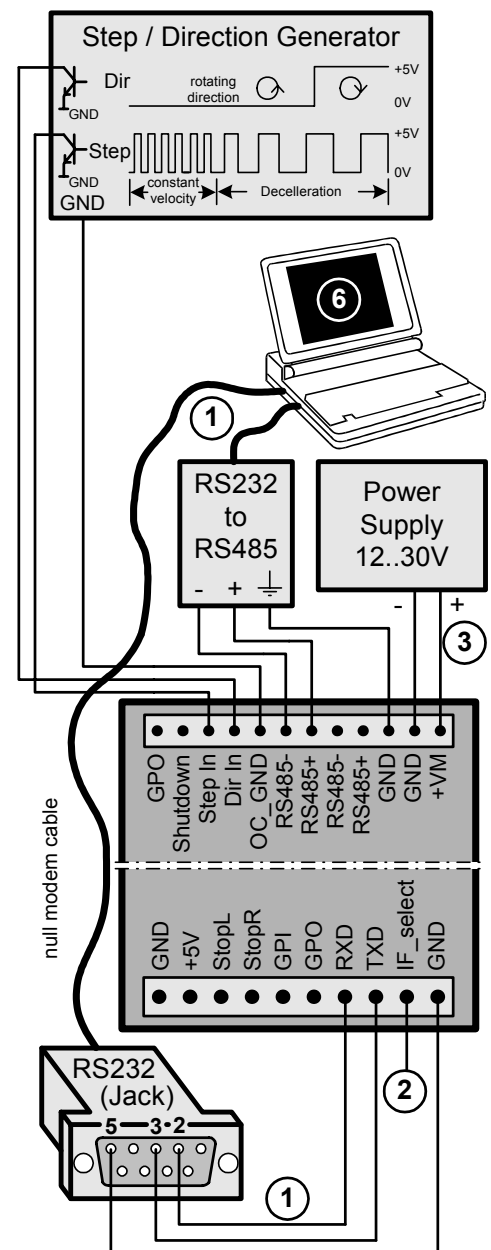
1. Make sure the COM port you intend to use is not blocked by an other program.

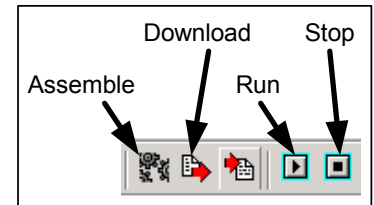**2.** Open TMCL IDE (available at TechLibCD and www.trinamic.com) by clicking TMCL.exe.

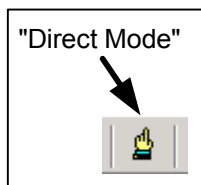**3.** Choose Setup and Options… and then the connection tab.

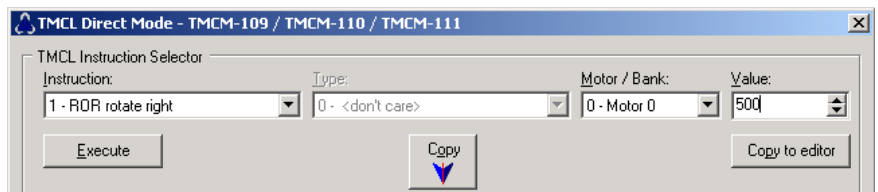**4.** Choose COM port and type in parameters shown above (baudrate 9600). Click OK.

5. Write a program code into the white field and save it with File/Save.

Assemble   Download   Run   Stop

6. Click "Assemble" first, then "Download" and "Run" button to start the program.

"Direct Mode"

7. Stop all running programs by clicking "Stop button" and start "Direct Mode".

8. If communication is established the PD-109 is automatically detected. Issue a command by choosing Instruction, Type, Motor, Value and press Execute to send it to the PD-109.

Commands:

Following commands can be included into a program or used in "Direct Mode". There are motion (ROR, ROL, MST, MVP) and SAP (Set Axis Parameter) commands to set motion and control parameters. GAP delivers their actual value.

Instr.	Type	Value	Description
ROR	(don´t care)	0..2047	Rotate right
	ROR <motor no.>, <Value>		
ROL	(don´t care)	0..2047	Rotate left
	ROL <motor no.>, <Value>		
MST	(don´t care)		Motor stop
	MST <motor no.>, <Value>		
MVP	ABS|REL|COORD	23 bit	Move to pos.
	MVP <type>, <motor no.>, <Value>		
SAP	2	23 bit	Actual pos.
	4	0..2047	Max speed
	5	0..2047	Max accell.
	6	0..1500	Max current
	7	0..1500	Standby curr.
	140	0..6	Microstep res.
	SAP <type no.>,<motor no.>,<Value>		
	Sets motion and control parameters		
GAP	GAP <type no.>, <motor no.>		
	Gives actual values of SAP parameters		

For full instruction set and further description refer to TMCL-Reference at TechLibCD or www.trinamic.com.

Troubleshooting:

If communication is not established:
- Check if the LED of the PD-109 lights. If not check your power supply.
- Try to start "Direct Mode" and see if the PD-109 is detected automatically. If not close window.
- Check if you are using the right COM port and it is not used by another program.
- Check your connection settings, default: 9600 baud and address 1.
- Check your interface connection to PD-109.
- Termination and telegram pause time OK ?
- Refer to PD-109 manual or Trinamic discussion group.

If motor does not respond:
- Usually it is a problem with the communication described above.
- If you are using a TMCL program try a movement command in "Direct Mode" to see if there is a problem with your program.
- Check the motor connection. And power LED of the module.
- Restore factory settings to cancel all settings modified by user by issuing instruction 137.

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