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User manual

PLCM series controllers

CONTENTS:

Check wiki.purelogic.ru for more detailed information

You will find information about concrete PLCM controller in «Connection and setting guide»

1. INTRODUCTION

PLCM series controllers represent the specialized CNC system controllers and are intended for connection of CNC machine to the personal computer (PC) by Ethernet or USB interfaces.

The controller operates with the MACH3* program and allows to control 6 axes simultaneously. The motion path is calculated preliminarily in MACH3, in process of information is quantized and transferred to the PLCM buffer. The controller independently forms STEP/DIR control signals for motors drivers according to obtained data.

Progressive technologies allow to avoid use of the outdated LPT interface. Because of that high noise immunity and operation stability are reached. For CNC machine control there is opportunity to use low-power computers, netbooks, placing them at distance to 100м from the CNC machine (in case of Ethernet connection).

The firms software allows to use in MACH3 input-output ports instead of built-in LPT-ports in PC. If you used previously PC LPT-port for drivers connection, you will need to disconnect the socket from computer LPT-port, to connect it to PLCM controller and to install corresponding plug-in for MACH3.

Each controller has at least one port, which is completely corresponding to the physical LPT socket.

*** It is possible on demand to obtain a communication protocol description between PLCM device and PC.**

2. OPERATION PRINCIPLE

The software of PLCM series controllers is designed so that as much as possible to unload your personal computer to the maximum and to transfer majority of CNC control functions to the controller. The main objective of the controller — to stabilize generation frequency of Step control impulses. In addition, the controller executes a great number of other functions which were performed previously by your personal computer by using MACH3 control.

For example, the controller has built-in generation block of movement control sequence. This block is used at jogging. When the user in MACH3 presses movement button, your personal computer transfers single command to controller about motion start on defined axis in defined direction. Controller itself performs displacement considering motion profiles which have been defined by the user in the MACH3 settings.

Homing and search of working surface (probing) also are completely performed by PLCM controller without PC. It is necessary for delay minimization between operation of position sensor and a tool stop.

All additional functions such as position limit sensors, check of soft limits conditions, torch height control (THC), PWM generation (pulse width modulation generation), Charge Pump signals and etc. also are realized by internal software of controller without MACH3, which is engaged only in G-code interpretation.

Because of this approach the computing load is almost completely removed from your PC. You will be enough even the low-power netbook for stable system operation.

3. FUNCTIONALITY

It is recommended to use the last MACH3 version for stable controller operation. Compatibility with outdated versions is not guaranteed.

Non-standard MACH3 functions:

• "Probing" function is available in truncated option. There shouldn't be simultaneously some axes in G31 command.

• "Pause" button and "Feed rate override" operate with delay equal to the sum of buffers sizes which are defined in plug-in settings.

• The braking in process of approach to soft limits is occurred according to accelerations profile, which have been set in Motor Turning without using of slow zone parameters.

Unsupported MACH3 functions:

• Feedback through external encoders.
• Verify function;
• Movement with use of MPG inputs.
• Types of lathe operations requiring synchronization of spindle rotation with tool movements, for example, thread cutting.

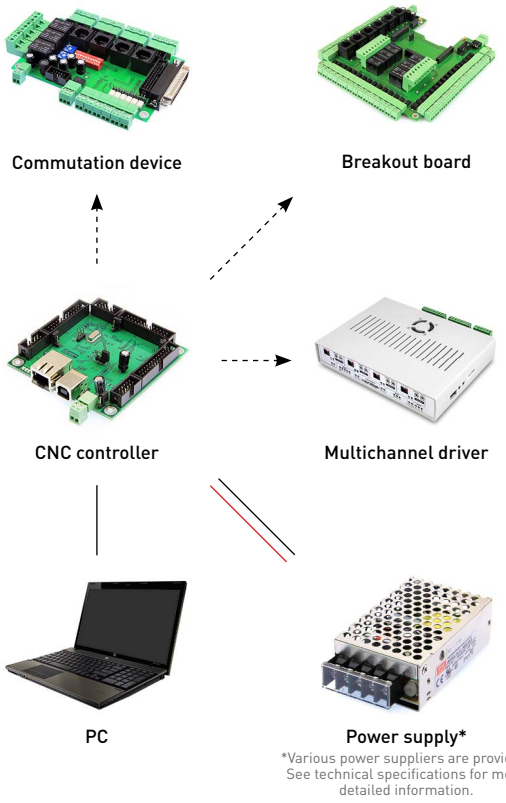


Fig. 1. PLCM series controller general diagram

4. MACH3 PLUGIN SETTING

Enter to «Plugin Control»->«PLCM control» menu to open the setting window. You will see the window similar represented in fig. 2.

This plug-in supports all PLCM series devices (both USB and Ethernet). Devices search occurs automatically during window opening.

It is necessary to choose one of the controllers connected to system from the dropdown list. If the list is empty, see the controller installation instruction.

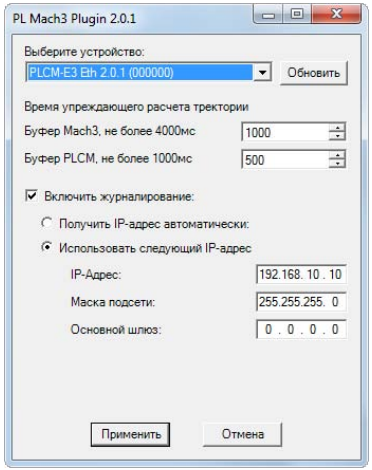


Fig. 2.
PLCM Plugin window

Additional settings will appear after a choice. These settings can differ slightly depending on by PLCM device used by you.

You can find the detailed settings description in the installation instruction of your controller.

5. SOFTWARE VERSIONS OF PLCM SERIES DEVICES

PLCM series firms software consist of two parts:

a) Plugin for MACH3.

Plugin – special program file connected to MACH3. It provides personal computer and controller interaction and is a component necessary for work. The plugin is delivered in two versions: testing and stable. The installation process of plugin is described in more detail in the installation instruction.

b) Firmware for PLCM device

Firmware is a software established directly on PLCM controller. Firmware contains in plugin and its updating becomes possible after plug-in updating. Firmware version should to correspond plugin version therefore it is necessary to update firmware after plugin updating. The plug-in automatically will suggest to update a device firmware after opening «PLCM control» dialogue (fig. 3). You can find detailed settings description in the installation instruction of your controller.

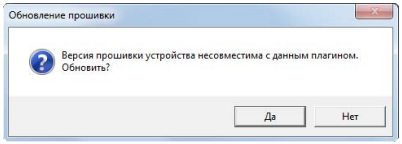
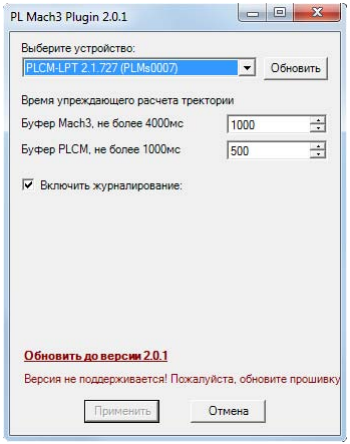


Fig.3. Updating of device firmware



6. POSSIBLE PROBLEMS AND THEIR SOLUTIONS

1. USB driver isn't installed in OS Windows7 64bit.

Reason: If drivers of devices didn't pass certification in Microsoft certified center they are forbidden for installation in this OS version by Microsoft Company.

Solution: There is no suitable solution. But you can enable manually using unsigned drivers on every boot of your OS by pressing F8 key and selecting "Disable Driver Signature Enforcement" option.

2. «Link» LED doesn't light up or long blinks in process of Ethernet cable connection to PLCM.

Possible reasons: damaged cable, non-working Ethernet switchboard, non-working network interface card, impossibly to determine connection parameters automatically.

Explanation: This indicator reflects a condition of physical connection to the Ethernet network. In case of successfully established connection the indicator has to be alight constantly.

Solution: Check cables, connections, operability of equipment and its settings by the methods similar to diagnostics of problems in a local network. Set connection mode 10Mbit/Full to Duplex in settings of the network interface card.

3. When Ethernet cable connects to PLCM, "Link" LED be alight at once, but the device with the address 192.168.10.10 isn't pinged.

Possible reasons:

1) IP-address of controller doesn't correspond to default value.

2) IP-address of PC is set incorrectly.

Explanations: PLCM Ethernet-devices have preinstalled address 192.168.10.10., therefore computer has to be in the same subnet for successful IP connection.

Solution:

1) Reset device settings to default settings (see "Installation instruction").

2) Adjust PC address to any address from a network 192.168.10.xx manually or by using "set_ip.exe" utility from the software archive (see "Installation instruction").

4. PLCM Ethernet is pinged, but is not available from the configuration window of a plugin.

Possible reasons: Firewall or another program blocks a traffic between PLCM and the computer.

Explanations: Plugin uses broadcast queries under the UDP protocol for detection of all PLCM devices in a local network. Some programs in Windows OS, for example, a firewall or an antivirus, can block similar network inquiries.

Decision: Find and disable the program which blocks a traffic.

5. Reset button isn't pressed after MACH3 start.

Possible reasons: a great number of reasons, the most prevalent: MACH3 couldn't establish connection with PLCM; E-Stop signal is active; signal from limit sensors of position.

Solution: depends on the message outputted by MACH3 in the status bar which is situated in the bottom left corner of program screen.

Recommend to do the following if you haven't found solution of your problem:

• check MACH3 version. Update MACH3 if it is necessary.

Operability of a plugin for PLCM is guaranteed only for the current Mach 3 versions

• if problem is still exist contact the help desk: support@purelogic.ru, having provided the following information:

1. Full MACH3 version (e.g. MACH3 R3.043.022).

2. The version of a used plugin (e.g. 2.1.705).

3. Profile used by you for MACH3.

4. Detailed description of the actions, which are necessary for mistake reproduction.

5. G-code (if the mistake is related to implementation of the concrete file).

6. Operation log-file of plugin during mistake emergence.

Creation of a log file requires to enable logging in the plugin settings (Plugins --> PLCM config). It is necessary to remember that in each system switching-on by the Reset button, the new file of the report is created, and previous file is erased. Therefore after logging enabling, press Reset, make necessary actions for repetition of a problem and press Reset for disconnection of PLCM from MACH3. The file of the report can be found to the address «C:\MACH3\PLCM.log» (or «C:\MACH3\PLMach.log» in early versions of plugins).

Pay attention that documentation can be changed due
to constant technical upgrading of production.
You can download last versions from **www.purelogic.ru**

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