Mach 3 Based CNC Control Kits

Now available from Ajax CNC - Simple Mach 3 based plug and play CNC Control Kits starting at only $1795! Save time and money and do it yourself with a kit specifically designed for you to connect your own PC with Mach3 CNC software via a standard Ethernet cable, for full CNC capability.

In this document:

- Kit descriptions and photos
- Kit diagrams
- Pricing
- Frequently Asked Questions

Two basic kit configurations are available:

- Mach3 CNC Kit with 3-Axis DC Servo Drive & PLC
- Mach3 CNC Kit For 3rd Party Drives With PLC

For more information regarding AjaxCNC’s Mach CNC kits, or questions regarding the information contained in this document, please contact:

sales@ajaxcnc.com

AjaxCNC
159 Gates Road, Suite A
Howard, PA 16841

814-360-0279

Or visit www.ajaxcnc.com
This kit includes the major components you need for a fully capable DC CNC system, perfect for the do-it-yourselfer who wants to save money and still have all the features of a more expensive off-the-shelf system. AjaxCNC has bundled together a fast, reliable DSP-based CNC CPU card (our "MPU11"), with a 15 amp 3-axis servo drive and PLC combo (our "DC3IO"), into a dead simple plug-and-play system optimized for use with Mach3 software. Not only that, we've taken all the work out of configuring your system: coolant, lube, spindle control, limits, and more have dedicated connections and are pre-programmed and ready to run.
Shown above is a depiction of a typical setup for this kit - only a few simple connections are required, and all components are powered by standard household 110VAC. Install Mach3 software and AjaxCNC’s included plugin on your PC, connect it via Ethernet to the CNC CPU card, plug in your motors and switches, and you’re essentially ready to run!

Need more options or expanded PLC I/O? Want to add a 4th axis, digitizing probe, tool length setter, MPG handwheel, or operators control panel? No problem! Our kits are expandable, upgradeable, and have the flexibility to meet nearly any application.
Above is a more detailed diagram and overview of how our kit components work together in a complete CNC system. Please note that motors, cables, Mach3 software and some other depicted components are sold separately (or you may supply or reuse your own).

Our Mach3 kits solve a major problem of other PC-based systems: we provide a dedicated CNC CPU card (our "MPU11"). Other systems rely on your PC's internal processor to command servo drives -- any "hiccups" or problems on your PC while running a job are instantly transferred to the drives on these "hobby" systems. AjaxCNC's Mach3 kits also feature two-way Ethernet communication, so that Mach3 on your PC always receives position feedback and never has to guess at the position of the machine (like in other systems without two-way Ethernet communication).
MPU11 Motion Controller

- Fast Ethernet based communication with any capable PC running Mach 3 CNC software
- DSP-based motion control
- 6 encoder inputs onboard
- MPG, probe, and jog panel/pendant connections
- Fiber optic connection
- Multi-axis homing and jogging
- Includes power supply
DC3IO 3 Axis DC Servo Drive & PLC

- 3-Axis 15amp closed loop DC servo drives
- PLC 30 In / 31 Out onboard (expandable to 240 I/O)
- Pre-programmed I/O for:
  - Programmable Spindle Speed
  - Programmable Coolant
- Limit switches can be wired directly with no further software configuration needed
- Auto homing to limit switches or encoder index pulse
- Auto lube control

This kit includes power supplies and connectors for the above components and 5' fiber optic cables for communication. Ready-to-run servo motors with encoders are sold separately on www.ajaxcnc.com. Mach3 software is available directly from Artsoft & Newfangled Solutions LLC, and is not included in pricing below.

Mach3 CNC Kit With 3-Axis DC Servo Drive & PLC: $1795.00
This kit includes the major components you need for a fully capable CNC system (AC or DC), perfect for the do-it-yourselfer who wants to save money and supply (or re-use) their own motors and drives. AjaxCNC has bundled together a fast, reliable DSP-based CNC CPU card (our "MPU11"), with a Drive Interface and PLC combo board (our "GPIO4D"), into a dead simple plug-and-play system optimized for use with Mach3 software.

This system will communicate with any -10v to +10v drives.
Shown above is a depiction of a typical setup for this kit - only a few simple connections are required, and all components are powered by standard household 110VAC. Install Mach3 software and AjaxCNC's included plugin on your PC, connect it via Ethernet to the CNC CPU card, plug in your drives and motors, and you're essentially ready to run!

Need more options or expanded PLC I/O? Want to add a 4th axis, digitizing probe, tool length setter, MPG handwheel, or operators control panel? No problem! Our kits are expandable, upgradeable, and have the flexibility to meet nearly any application.
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Our Mach3 kits solve a major problem of other PC-based systems: we provide a dedicated CNC CPU card (our "MPU11"). Other systems rely on your PC’s internal processor to command servo drives -- any "hiccups" or problems on your PC while running a job are instantly transferred to the drives on these "hobby" systems. AjaxCNC's Mach3 kits also feature two-way Ethernet communication, so that Mach3 on your PC always receives position feedback and never has to guess at the position of the machine (like in other systems without two-way Ethernet communication).
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- Multi-axis homing and jogging
- Includes power supply
GPIO4D 3rd Party Drive Interface & PLC

- Enables communication with up to four 3rd party servo drives
- 16 bit analog to servo drives -10v to +10v
- 12 bit analog to spindle inverter 0 to 10v
- 16 general purpose I/O onboard (expandable to 240 I/O)

This kit includes power supplies and connectors for the above components and 5' fiber optic cables for communication. Ready-to-run servo motors with encoders are sold separately on www.ajaxcnc.com. Mach3 software is available directly from Artsoft & Newfangled Solutions LLC, and is not included in pricing below.

**Mach3 CNC Kit For 3rd Party Drives With PLC: $1815.00**
Mach 3 Based CNC Control Kits - Frequently Asked Questions

How are AjaxCNC’s Mach kits different from other competing products?

- AjaxCNC provides a dedicated, stand-alone digital signal processor, just like "real" CNC systems use. Other competing Mach systems rely on your PC’s internal processor, which often results in hesitant or unreliable motion any time your PC "hiccup" during a job.
- Our kits utilize an Ethernet connection for true two-way communication – this enables Mach software to receive real-time position feedback, instead of simply guessing at and assuming the position of your machine.
- AjaxCNC provides pre-configured PLC functions for items such as limits and coolant wherever possible so you can be up and running quickly.
- Price – because we design and manufacture our components from the ground up, we can provide feature-rich CNC kits that are more affordable for the do-it-yourselfer.

Which of the two kit configurations is right for my project?

Please refer to the chart below:

<table>
<thead>
<tr>
<th></th>
<th>Kit With 3-Axis DC Servo Drive &amp; PLC</th>
<th>Kit For 3rd Party Drives With PLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$1795 USD</td>
<td>$1815 USD</td>
</tr>
<tr>
<td>Servo motor type</td>
<td>DC</td>
<td>AC or DC</td>
</tr>
<tr>
<td>Servo motor size</td>
<td>Up to 40 in lb</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Number of axes (standard)</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Number of axes (expandable to)*</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Number of encoder or scale inputs</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>General purpose I/O (standard)</td>
<td>30 In / 31 Out</td>
<td>16 In / 16 Out</td>
</tr>
<tr>
<td>General purpose I/O (expandable to)*</td>
<td>240 In / 240 Out</td>
<td>240 In / 240 Out</td>
</tr>
<tr>
<td>Included servo drives</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Preconfigured I/O</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Spindle control</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Available operator's control panel/pendant*</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Available digitizing touch probe*</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Available MPG (manual pulse generator) handwheel*</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Available auto tool length setter*</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
* Expandable features and accessories may require purchase of additional components. Prices and specifications are subject to change. Please refer to www.ajaxcnc.com for the latest pricing and information.

**Do AjaxCNC's control kits accept Step and Direction?**

AjaxCNC's kits replace and greatly improve on old "step and direction" parallel port systems. With true two-way Ethernet communication we provide the hardware required to eliminate "missed steps" and position errors.

In step and direction systems, there is no position feedback to your CNC software – the software can only command the movement and assume that the machine has responded accurately. The position displayed on the digital readout will always be an assumption – small errors and missed steps can compound over a job and waste material and time.

With our Ethernet-based communication, your CNC software (Mach3) is constantly receiving real position feedback during a job – the software commands a movement, the machine responds, and the software instantly gets feedback and displays the true position of the machine. What would be position errors in old step and direction systems are automatically corrected, before the next move is attempted.

**What are the system requirements for the PC that I will need?**

Generally speaking, any modern Windows computer that is capable of running Mach3 software will be adequate. (You should check the Mach3 software and hardware requirements.) Also note that because AjaxCNC’s kits utilize an Ethernet connection to your PC, you may wish to obtain a second network/Ethernet card for simultaneous networking purposes.

**What are the power requirements of the kit components? Will AjaxCNC's Mach kits work outside of the USA?**

AjaxCNC Mach3 kit components include power supplies for logic circuitry which can accept 110 or 220 VAC. Standard 110v power cords with 3-prong grounded plugs are included by default. See chart below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Power Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPU11 Motion Controller</td>
<td>Included power supply accepts 85 to 260 VAC</td>
</tr>
<tr>
<td>DC3IOB Servo Drive &amp; PLC</td>
<td>Includes a switchable power supply with 110 and 220 VAC settings for the logic circuitry. Incoming motor voltage supply requirement is 20v to 120v DC.*</td>
</tr>
<tr>
<td>GPIO4D Drive Interface &amp; PLC</td>
<td>Included power supply accepts 85 to 260 VAC</td>
</tr>
</tbody>
</table>
AC to DC power supply transformer kits and components are available through www.ajaxcnc.com.

**What drives will work with the "3rd party drive kit"?**

The kit for 3rd party drives will command any servo drive capable of accepting -10 to +10v.

**Do you have servo motors and encoders for sale?**

Yes, AjaxCNC does sell a range of servo motors with encoders pre-installed and ready to run! Visit www.ajaxcnc.com for sizes and more information.

**What accessories are available for use with AjaxCNC's Mach kits?**

Our Mach kits have been designed to support our digitizing touch probe, manual pulse generator (MPG) handwheel, operators control panel/pendant, and automatic tool length setter. These items as well as other components and accessories are available from the CNC accessories page of www.ajaxcnc.com.

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Prices, features, products and specifications contained in this document are subject to change. Please refer to www.ajaxcnc.com for the latest information and pricing.