

Blood Analyzer Motion Control Application

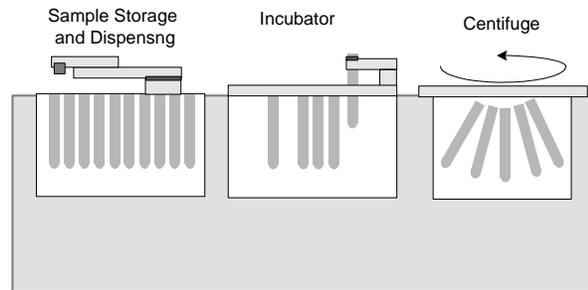
Multi-axis coordinated motion of a compact table-top clinical device

Application Challenge:

Efficiently and cost effectively create a motion control architecture that can support multiple axes and multiple motor types while maintaining the compact table-top size of the equipment.

Application considerations:

Feature/Function	Units
Control architecture:	Card based
Number of axes:	7-10
Motion mode:	Point-to-point, multi-axis point-to-point, velocity control



Motion Control Solution

This application is well suited for 2-3 Prodigy® PCI Motion Cards and an ION 500 digital drive. The ION is used for spinning the centrifuge and the Prodigy Motion Cards for the 2- to 3-axis arms and 1 rotor each, in the sample storage carousel, and incubator. This motion control architecture could be designed in several alternate ways depending on the machine's requirements. A PCI, PC/104 or stand-alone format could be chosen for the motion cards with each having advantages. If compact size is a consideration then the PC/104 format could reduce the overall control system size by using stacked motion cards mounted on the control system mother board. If a more distributed architecture is needed then the stand-alone format can be used to mount the motion cards at the sub-systems.

Velocity profile mode with time break points

Using the velocity profile mode the centrifuge can be set up to run at various the velocities at predetermined time points that match the specific process to achieve variable speed control and the resulting R.C.F. (relative centrifugal force). In this mode the motion is controlled by changing the acceleration, velocity, and deceleration parameters while the profile is being executed. The ION supports up to 2 breakpoints. The trigger condition can be one of 10 parameters. For this application the trigger condition is Time. At each trigger point the acceleration and velocity parameters are updated and the next set of parameters loaded.

Motion control programming

Programming the Prodigy Motion Cards and the ION Digital Drive is managed with C-Motion®, a source code library of motion commands for development of C/C++ programs that run on the on-board host.

Multi-motor type support

Prodigy Motion Cards support multiple motor types, DC brush, Brushless DC, and stepper, and also pulse & direction amplifiers. Each axis on a card can be a different motor type. This allows for optimized motor selection in the system for both cost and performance. For example in figure 1 the 2- to 3-axis arm in the sample storage carousel and the incubator use step motors and the incubator and storage carousel rotors are brushless DC motors.

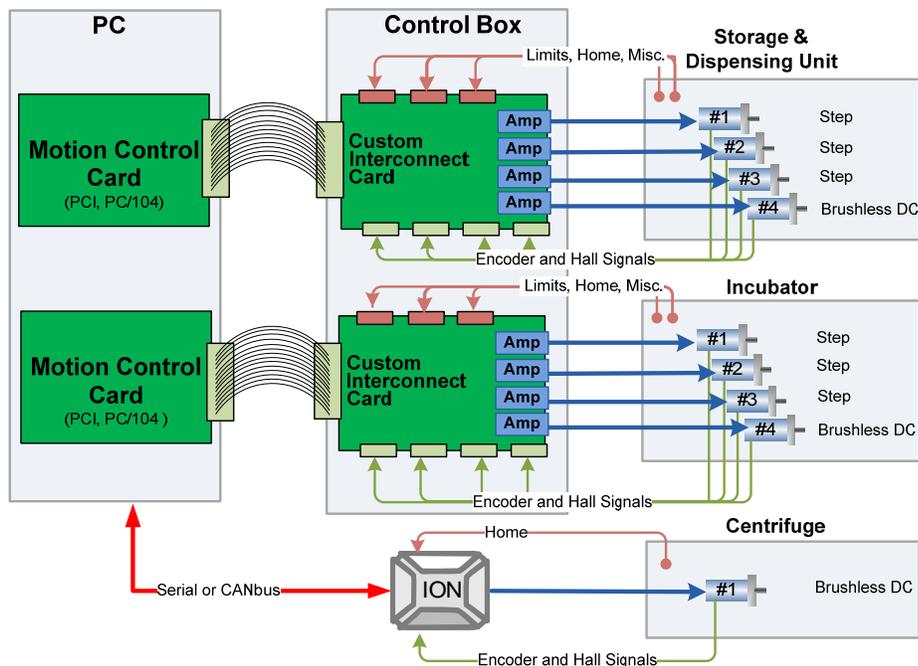
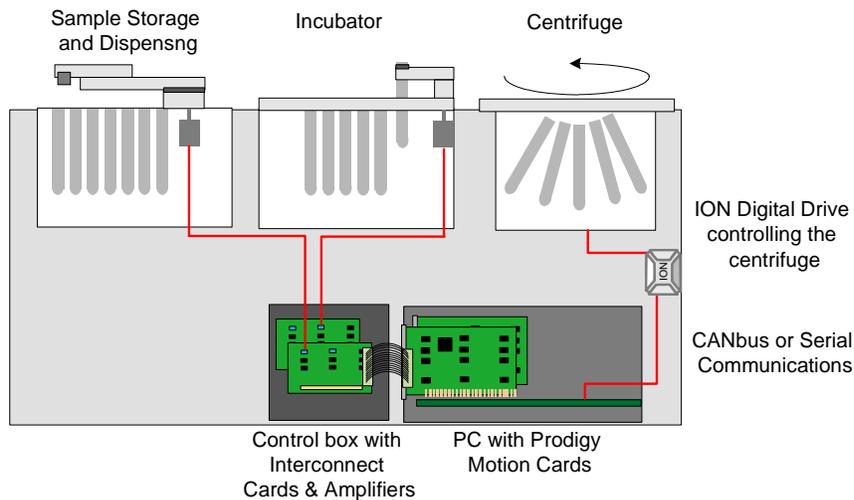


Figure 1 illustrates the connections from the PC to the Prodigy PCI motion cards and ION Digital Drive, interconnect cards, amplifiers and motor for the centrifuge unit. Figure 2 shows the overall system controlling 7 to 10 axes.



All **Prodigy Motion Cards** and **ION Digital Drives** provide high performance motion control supporting multiple motor types including DC brush, brushless DC, step, and microstepping motors, and are based on PMD's Magellan® Motion Processor, which provides user-selectable profile modes including S-curve, trapezoidal, velocity contouring, and electronic gearing.



Contact our customer support team at +1 781 674 9860 for more information including details on Developer's Kits and application support. We would like to assist you in improving your motion system.