

New VariGrip™ III Multi-Device Prosthetic Controller



Liberating Technologies, Inc. has been producing microprocessor-based prosthetic controllers for several years. The latest in this advanced technology is the programmable VariGrip III Multi-Device Prosthetic Controller for powered upper-limb prosthetic systems. This controller operates up to four prosthetic devices and uses control strategies tailored to the user. The system adapts to the patient rather than requiring the patient to adapt to the controller, thus reducing training time and increasing functionality.

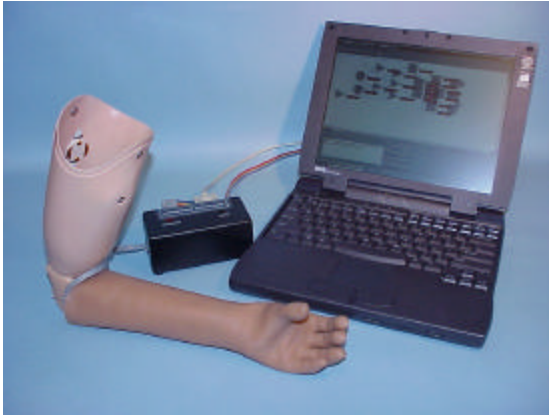
The VariGrip III Controller is universal so it can operate prosthetic devices from any manufacturer, even systems with a mix of components from different manufacturers. This allows the user to select the best combination of hands, wrists and grippers for their individual needs. It is light-weight and small, about half the size of competitive controllers, making it ideal for all prosthetic applications including children. Because of its small size, it can be concealed in the prosthesis and when combined with a built-in battery, it results in improved cosmetic appearance.

Traditionally, prosthetic controllers were designed to perform one function. The prosthetist chose the control strategy and ordered the appropriate controller from the manufacturer. The user was then required to learn how to use this control strategy and in some cases this involved significant training. Early microprocessor-based controllers were similar in that they were programmed to perform a specific task. However, they allowed the prosthetist to make adjustments for the individual user. The new VariGrip III Controller takes this one step further. It can be programmed with a variety of control strategies to make it easier for the user to operate the system. These strategies are pre-programmed and can be down-loaded to the users prosthetic system by the prosthetist. This allows the prosthetist to try several strategies with the user and to choose the one best suited for their particular needs. Once a strategy is chosen, the controller can then be fine-tuned through software-adjustable settings, providing significantly more adjustment than previous prosthetic controllers. The result is a control strategy and user-specific adjustments that allow the user to obtain maximum performance.

The VariGrip III Controller has an additional feature. It can be used to **evaluate** the patient to determine which control strategy would be best for them. In addition to signal strength, unwanted muscle noise and co-contraction coordination can be assessed. Following the patient evaluation, the prosthetist will know if the patient has sufficient muscle signal strength and coordination to operate the prosthetic system myoelectrically. If not, the VariGrip III Controller can be used with other input devices, and up to five can be used on a single system. Force-sensitive resistors (or Touch Pads™), switches and positional-servo transducers are all options. Again, the best input device can be chosen to accommodate the capabilities of the user.

HCPCS recently issued a new L-code for microprocessor-based prosthetic controllers such as the VariGrip III. L6882 "Microprocessor control feature, addition to upper-limb prosthetic terminal device" provides additional reimbursement for this new class of robust controllers.

LTI **Liberating Technologies, Inc.**



The VariGrip III Controller represents the “next generation” of controller for upper-limb prosthetic systems. This versatile controller can be used to evaluate the patient, determine the best control strategy or strategies and adjust the prosthetic system for optimal performance. The end result is a more suitable control system for the user and less training allowing them to become proficient with the system more quickly. The VariGrip III Multi-device Controller is programmed with software developed at the Bloorview-MacMillan Centre in Toronto, Ontario, Canada.

The present release of the MyoWizard™ and MyoAssistant™ software have sixteen control strategies available. These represent the most common methods of operating powered prosthetic systems. New strategies are being developed and will be added in future releases in the software.

Control Strategies for VariGrip III Multi-device Programmable Controller

2 myo (myoelectric) inputs, *co-contract* fast to select next device
 2 TP (Touch Pad) inputs, *co-activate* fast to select next device

2 myo (myoelectric) inputs, use *momentary switch* to select next device
 2 TP (Touch Pad) inputs, use *momentary switch* to select next device

2 myo (myoelectric) inputs, *co-contract* fast or use *momentary switch* to select next device
 2 TP (Touch Pad) inputs, *co-activate* fast or use a *momentary switch* to select next device

2 myo (myoelectric) inputs, contraction *rate* selects device, myo controls speed and direction
 2 TP (Touch Pad) inputs, *rate* of activation selects device, TP's control speed and direction

2 myo (myoelectric) inputs control speed of 2 devices, *alternate* contractions alter direction
 2 TP (Touch Pad) inputs control speed of 2 devices, *alternate* activations alter direction

2 myo (myoelectric) inputs control 2 one-speed devices, *alternate* contractions alter direction
 2 TP (Touch Pad) inputs control 2 one-speed devices, *alternate* activations alter direction

2 myo (myoelectric) inputs control 2 one-speed devices, contraction *strength* selects direction
 2 TP (Touch Pad) inputs control 2 fixed-speed devices, activation *strength* selects direction

1 myo (myoelectric) input, one-speed devices, *strength* selects direction, switch selects device

1 TP (Touch Pad) input, one-speed devices, *strength* selects direction, switch selects device

MyoWizard provides a list of available control strategies as well as a complete description of their features and benefits. To select one, the prosthetist simply highlights the preferred strategy and downloads it to the VariGrip III Controller. If the user is not satisfied with this control strategy, the prosthetist selects a different strategy until a suitable one is found. Once the strategy is chosen, **MyoAssistant** is used to make necessary adjustments to the system. This results in a custom control system that is optimum for the individual user.