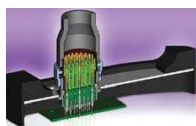


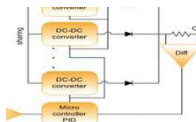
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## Industrial Automation

By Steve Scanlon,  
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<http://ept.hotims.com/23482-134>

# Modularity in robotics provides automation for all

Robots have brought significant advances to the manufacturing process in the past decade. Industries such as assembly, palletizing, materials handling, welding and even painting currently use robots to facilitate their everyday work and advancements are released daily in this fast-paced market. New innovative technologies being introduced to the market by Robotics Design Inc., however, allow industrial robots to be used in ways that mean automation for everyone.

Christened 'ANAT technology' in 1997, this technology has given birth to three generations of robots, namely the AMI-100, a modular robotic industrial manipulator. Attached to a base, this robot features a hyper-redundant articulated arm made from identical connected modules. Each module contains an entire robotic system and motor, and is made with Robotics Design's patented U and H shaped modules, making them cost and time efficient to produce and structurally rugged.

Repair work is quick and inexpensive, as broken modules can easily be replaced by identical modules. The arm can bend at the axis of each module, mimicking the natural movement of a snake. This allows the AMI-100 to avoid obstacles with ease and perform complex tasks in limited work envelopes.

The arm can bend at the axis of each module, mimicking the natural movement of a snake.

Many new markets can be served because of the flexibility of these robots. For ship repair, technicians must first cut the ship's hull, effectively separating it in two, allowing workers to reach small, inaccessible areas. Using a simple AMI-100, Repair could be easily performed at sea, the AMI-100 can easily bend around several obstacles to reach these areas which are characteristic to ships and weld, cut or perform numerous complex procedures with minimal space to maneuver.

For the automobile industry, trained workers are required to perform numerous tasks in the small obstacle ridden area of a car's frame and engine. The AMI-100 renders this method of production obsolete, as the AMI-100 has more flexibility and strength than a man, and a single robot could produce a finished car in with more time as space efficiency than several trained workers performing the same tasks.

Other virgin markets to robot use such as construction, building maintenance, even farming and food preparation have access to a low-cost robot that will automate their industry through the AMI-100. Programming of these robots is performed through a highly user-friendly program which allows users to map out the production of an automobile or ship using only a mouse. Factories equipped with ANAT technology will have access to fully automated industrial robots which are durable, inexpensive to produce and repair and work more efficiently than any



A compact portable version of the AMI-100, weighing 50kg, is able to manipulate 100kg with ease. Composed of a series of identical linked modules, the above prototype shows a robot with serpentine flexibility configured with 8-degrees of freedom.



The robot's serpentine links arranged in a scara configuration increases robot flexibility and allows for maximum load capability.



From manipulators to welding machines to painting robots, these two modules are the core components of ANAT robotic arms. Fast and inexpensive to produce, robots made with this modular configuration can shift shapes to perform different tasks or work in several different work-envelopes.

existing robot or even trained workers, particularly in tight workspaces.

At the workplace modular robots represent a significant advancement in the manufacturing process and the next step in automation. The current view on industrial robots is that only the largest manufacturers have access to them, and that a single robot will be specialized in a single task, and will be replaced when new advancements or a shift in factory goods production is implemented.

Modularity allows an arc welding robot to put down its tools and pick and place

pallets or switch its tools to perform any task it is commanded to. This means that these automated robots can be both specialized and diverse, and single robots can perform tasks representing every step of the manufacturing process. For smaller manufacturers, automated factories containing one or several robots can be produced, with manpower only being used for intellectual tasks, such as programming and management, allowing goods to be produced with the productivity of a large manufacturer while maintaining low overhead costs. Industrial giants

who currently use robots will be able to expand the use of their robots to tasks in small and unreachable workspaces where obstacle avoidance abilities are critical for their tasks. Another main advantage of this technology is that robots can be reconfigured or self-reconfigure to perform different applications.

A shift in production from one good to another typically would require a completely different set of machinery specialized in the new manufacturing process. With ANAT robots, the while accessory and tools may need to be changes, the arrangement of the modules

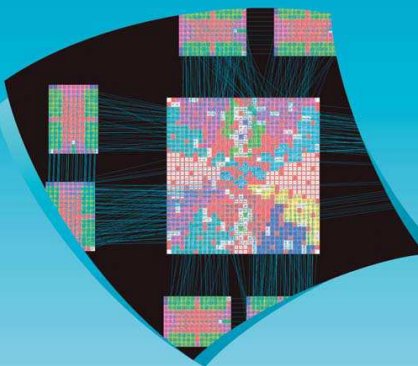
These robots mimic the bio-mechanical movements of the human body.

can be changed easily, meaning that a single factory equipped with ANAT technology has the potential to manufacture any good which can be produced on an assembly line. Robot placement and positioning can re-arranged by factory owners in case of a change in their manufacturing procedure, meaning factories equipped with ANAT technology are the perfect factories or any and every manufacturing procedure.

These robots mimic the bio-mechanical movements of the human body, and along with their constantly developing developed artificial intelligence systems they are able to replace trained workers at almost every stage of the manufacturing process, and perform far more efficiently than trained workers for manual labor, especially for repetitive tasks which can

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The Cadence Allegro and OrCAD FPGA System Planners offer optimized correct-by-construction FPGA pin assignments that minimize the number of iterations during PCB layout while reducing the number of layers required to route the FPGA. This innovative design solution is scalable, shortens design time, reduces product costs and mitigates risk.

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### Termination tool completes 8 punchdowns at once

Interchangeable blade heads for JackRapid termination tool now support common jack styles used by cable installers, including Panduit NetKey Category 5e and Category 6 Punchdown Jack Modules (NKP5E88M and NK688M). Tool terminates and trims all eight wires in a jack at once with one easy squeeze. FLUKE NETWORKS

<http://ept.hotims.com/23482-141>

### Clamp meter captures last reading, peak value

AEMC CM605 Multifunction Clamp-on Meter measures ac and dc voltage up to 600V, ac and dc current to 100A, and resistance to 10k $\Omega$ . It also includes continuity buzzer to assist in circuit verification, can hold the last reading, and captures peak value at time of measurement. Relative function compares two measurements on auto-ranging 10,000 count LCD display.

TECHNICAL SYSTEMS

<http://ept.hotims.com/23482-142>

## Modularity in robotics

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be programmed to do the job perfectly time and time again.

Although Robotics Design Inc. offers existing products such as the AMI-100 which can perform a myriad of tasks, this technology is truly diverse because it is completely customizable. Projects involving modular robots are at their prime when customized for one or several specific tasks, and the Lego-like construct of these robots allows them to be arranged in the perfect configuration to resolve real problems faced on the job, and take up the least workspace per robot possible, while ensuring that robots will not waste working hours dodging one another.

The AMI-100 is typically designed with a mono, duo or quadra arm configurations, with each arm being controlled by a single processor, making co-ordination of arms far less complex than when dealing with separate robots. This allows the robot to perform tasks that would typically require two hands working together, in anything from car building to making a hamburger. The size of each module can also be scaled based on specific user needs, and therefore robots of all types and sizes can be produced and can support electrical, pneumatic and hydraulic engines. This technology also allows the creation of mobile robots such as the ANATROLLER family, manual ergonomic arms such as the ANATERGOARM and many others ranging from humanoids to exploration robots.

As much as robots represent the future of manufacturing, modularity represents the future of robotics. Any manufacturer, regardless of his company's size or the tasks he performs will have access to high-tech automation at inexpensive prices, and will be able to produce goods using little to no man-power where physical work is concerned.

For manufacturers, while what they might see in these robots is more money for them, the macro-effect that ANAT robots will have is to initiate a new era in manufacturing, a completely automated era where humans no longer need to perform repetitive manual labor and can move to more intellectual tasks which will inevitably bring further advancements to society and help improve the quality of our lives. In a nutshell, automation is the key to productivity, and through Robotics Design's industrial modular robots, this door is open for all.

For more information on 'ANAT technology' or the AMI-100 modular robotic industrial manipulator from Robotics Design Inc., go to <http://ept.hotims.com/23482-134>.



### Electronic dc loads simulate non-linear behavior

63600 series dc electronic loads for portable benchtop testing draw 100W x 2 (dual), 300W or 400W maximum power in three current ranges. DSP technology can simulate non-linear loads using constant impedance operation mode to allow realistic loading behavior. Rear panel I/O port (D-SUB 15pin male connector) provides 0 to 10Vdc analog signals to monitor voltage and current, external analog signal input and TTL compatible digital I/O signals.

CHROMA SYSTEMS SOLUTIONS

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### Fanless PCs provide flexibility

ValueLine fanless PCs combine 15 or 17" TFT touch screen, 1.5GHz Core 2 Duo or 1.0GHz Celeron M CPU, up to 4GB DDR-AM, dual 10/100/1000 Ethernet ports and several mounting options. Maintenance-friendly construction allows quick access to removable hard drive chassis, two CF slots and clock battery. Options include rugged 64GB SSHD (solid-state hard drive), PCI slots and Steeplechase VLC flow chart control software. Extended temperature range models are also available. PHOENIX CONTACT

<http://ept.hotims.com/23482-144>



### Dc-dc isolator converts signals with 0.1% accuracy

WAVEPak dc-dc isolator interfaces field equipment and control systems, converting and isolating high-level signals with accuracy exceeding 0.1%. Voltage or current inputs and outputs can be internally selected and scaled via front panel controls. Choice of current sink or loop-powered input mode allows use as active or passive input circuit. Test terminals permit verification of input and output current values without removing cables. LED indicators display signal status. TS35 DIN-rail mount package is just 12.5mm wide. WEIDMULLER

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