

review

tech sector

Parallax Toddler Robot kit
Parallax, Inc. (MSRP \$295)
By Patrick Lichty

Parallax has been one of the leaders in creating the genre of easy-to-use microcontrollers that have supplanted larger, more expensive brands like Allen Bradley for small applications. More importantly, their BASIC Stamp micros have a combination of affordability, extensibility, and ease of use that have made them fairly common within the electronic arts community, used by well-known artists like Penny and Steve Mann.

Another common application for the Stamp series of microprocessors is that of robotics, due to the fact that the Stamp II series can directly issue pulses to control small positional servos. This feature has been incorporated into numerous small robots from Parallax Lynxmotion, many home-brew manuals and controllers for the current fad of battle robots.

The Toddler is the logical extension to the application of microcontrollers into small robotics. The 10" tall bipedal robot which reminds me of a distant predecessor of Watto's repair droids from Star Wars, incorporates two microservos, an integrated controller board, and a remarkable spacious prototyping area on the upper platform. This prototyping area allows hobbyists to interface the embedded Stamp II to a number of sensors, modules, and chips for flexibility, and students to freely experiment with control devices to drive the Toddler.

One of the most impressive aspects of the Toddler is the degree of detail and craftsmanship Parallax put into creating this kit. It arrives in a large hinged poly project box with all parts, a Stamp programmer's reference, support software, and classroom manual for the construction and experimentation with the Toddler. The parts are all well labeled and impeccably crafted from machined and anodized aluminum, creating a robot that is really attractive as well as functional.

The kit went together in an afternoon in a college hallway, and it was running around terrorizing the Intelligent Agent editorial cats by the evening. The fit of all parts was exceptional, which lent greatly to the speed of construction. The only problem I had with construction was that one of the servos centered so that the tilt control horn was slightly off from 180 degrees, but this was due to the servo's construction, and was easily remedied with adjustments of the control arms.

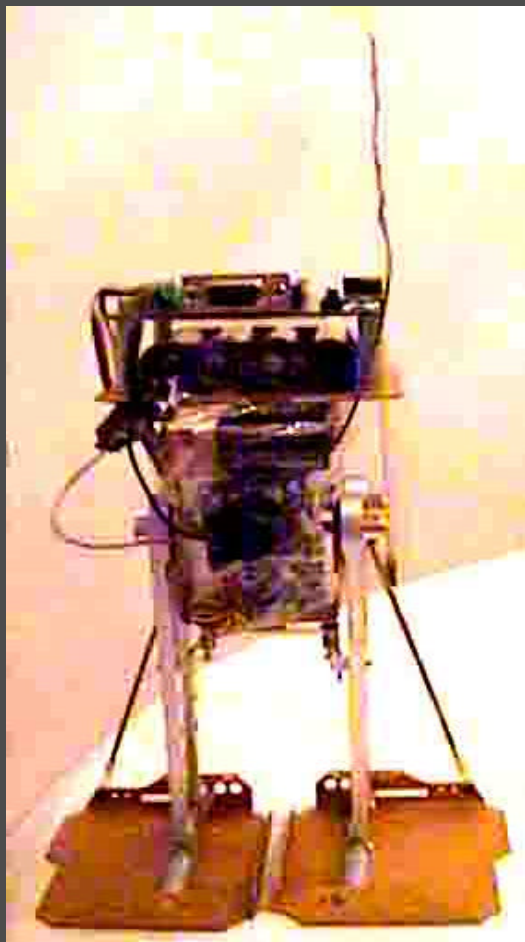
After that, it was time to begin programming the new arrival to become ambulatory. The classroom manual, and Parallax has framed the process well as being one of learning,



explains clearly about various techniques to solve the problem of walking from brute force to much more efficient state-transition analysis, which we hope to explore more in the coming days. After learning the basics of walking, the learner has the option of experimenting with various sensing techniques, maneuvers like object detection and following, and is then invited to consider more advanced techniques through the addition of Parallax AppMod kits.

ROAD TEST

However, we wanted to get our bot "on the road." What we did was to mount it with a video camera with transmitter, and extra 9 volt battery to run the transmitter and camera. The camera was a simple lightweight black and white CCD, and the transmitter was a high power Cube from Ramsey Electronics. As the test drive didn't require a lot of sensing,



The IA CamBot

no detectors were installed. However, in our haste to experiment, the battery we strapped to the platform was dead, so instead of removing it, we thought we'd try just taping another battery to the plat-

form. The results were excellent. The Toddler bore the 6 ounce load with no sign of instability or even much encumbrance. We took the robot on the back porch of the editorial offices and turned on the TV and even hooked up an inexpensive head mounted display to the VCR/reciever. What we got was a wonderfully bizarre little clip that reminded us of the point of view of Frankenstein's Monster if it were six inches tall. This was due to the fact that its legs do not have 'knees' per se, so it walks as if you locked your knees. That is to say, it walks really well, but it isn't going to climb any stairs without building a spring-loaded grappling hook add-on for it. We're looking forward to more experiments in the lab when this issue of Intelligent Agent is done.

Overall, the Parallax Toddler is an excellent platform for learning about the use of BASIC Stamp microcontrollers and small robotics. The only thing, and the only thing that's a little clunky about using the Toddler is having to unscrew the CPU/prototyping board from the upper platform to change the four AA batteries contained below. Even that's not a big inconvenience, as we've run the Toddler for about an hour now, and the batteries show no sign of weakening. The only other slight inconvenience is the lack of an on-board 12-volt power supply, which can usually be remedied by an inexpensive DC-to-DC converter.

The Toddler is an excellent choice for students, experimenters and experimental artists that has excellent documentation, ability for use as a microcontroller and robotics trainer, and interesting possibilities for limited installation/remote observation/telepresence. The embedded controller platform contains ample space for electronic experimentation, and the servo configuration allows for more than adequate strength when compared to other robots in its class.

