

## Review: Lego Mindstorms NXT Kit

**Op-Ed:** What can engineers learn about electronics product design from [Lego's](#) [1] [Mindstorms NXT](#) [2] kit? Abstract thinking, control, diligence, efficiency, low parts count, planning, and more. And last but not least, it's just [a whole lot of fun](#) [3] to build [robotic Lego contraptions](#) [4].

My own Lego experiences began in the late 1970s. By the mid-to-late 1980s I moved on to the "Expert Builder" series (now called the "[Technic](#) [5]" series, which would be a great fit for Mindstormsization themselves); the experience introduced me to the joys of mechanical engineering. The gears, mechanical assemblies, and pneumatics were far more advanced than other toys, even compared to [Erector](#) [6] sets. Meanwhile I already knew about computer programming, learning LOGO and then BASIC as early as grade school. Yet there was no way to combine these hobbies, so I moved elsewhere and stumbled into radio-controlled models.

What if there were a converged technology back then? Perhaps I would have become an engineer instead of just taking an industrial design minor in college. (Not that I regret becoming a writer!)

Today's youth have it better: they can learn from Mindstorms, which combines Bluetooth, microcontrollers, programming, and good old Lego-playing into one. The Lego Group sent me a full Mindstorms kit a few weeks ago to evaluate. My evaluation: I'd beg for this kit in a heartbeat, if only I were a child again. But child, schmid! We adults can get just as much enjoyment from this "toy" as our younger techie peers.

I built [the demonstration robot](#) [7], installed [the graphical development software](#) [8], connected the USB wire, and immediately started programming. Within minutes the robot began scampering across the floor, backing up, turning, and making if-then decisions by using its various sensors. Which leads to my only criticism: compiling, downloading, and executing programs between the software and the 32-bit microcontroller takes too long. Lego needs either a more efficient compiler, a bigger bandwidth connection type, or a faster microcontroller. My simple impatience will be utter frustration for most children.

If I had more time, I would have built the "[RoboArm T-56](#) [9]" model - whereas the robotic insect and robotic humanoids look cool, but hey, this is still *ECN*, where technology manufacturing is among our fetishes. It also would be fun to build some real industrial robots, and to use aftermarket sensors such as Dataport Systems' [HiTechnic](#) [10] series. For those readers who do have time on their hands, I highly recommend visiting some Mindstorms enthusiast sites like the Lego [Message Board](#) [11], Lugnet's [resources page](#) [12], [Nextlog](#) [13], and [Nxtasy](#) [14]. (If you know of other useful Mindstorms NXT online resources, then please email me by using the link below.)

*Update: When writing this article, I posted on two engineering forums, looking for*

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public feedback of the Mindstorms kit. Responses arrived from [EngineeringForum.org](http://www.EngineeringForum.org) [15] and [The Institution of Engineering and Technology](http://www.TheInstitutionofEngineeringandTechnology.org) [16]. Also, be sure to read my colleague Aimee Kalnoskas' [editorial](#) [17] and the [recent FIRST news](#) [18].

- Evan Koblentz      [email me](#) [19]

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### Links:

- [1] <http://shop.lego.com/product/?p=8527&LangId=2057&ShipTo=US>
- [2] <http://mindstorms.lego.com/>
- [3] <http://mindstorms.lego.com/Overview/NXTreme.aspx>
- [4] <http://mindstorms.lego.com/botstars/>
- [5] <http://technic.lego.com/en-US/default.aspx>
- [6] [http://www.erecworld.com/produits/trans\\_metal.php](http://www.erecworld.com/produits/trans_metal.php)
- [7] [http://mindstorms.lego.com/Overview/MTR\\_Tribot.aspx](http://mindstorms.lego.com/Overview/MTR_Tribot.aspx)
- [8] [http://mindstorms.lego.com/Overview/NXT\\_Software.aspx](http://mindstorms.lego.com/Overview/NXT_Software.aspx)
- [9] [http://mindstorms.lego.com/Overview/MTR\\_RoboArm.aspx](http://mindstorms.lego.com/Overview/MTR_RoboArm.aspx)
- [10] <http://www.hitechnic.com/>
- [11] <http://club.lego.com/messageboards/ShowForum.aspx?ForumID=1042>
- [12] <http://www.lugnet.com/robotics/rcx/>
- [13] <http://mindstorms.lego.com/NXTLOG/default.aspx>
- [14] <http://nxtasy.org/about/>
- [15] <http://www.engineeringforum.org/forum/showthread.php?s=d08209f38b62d2520991b0aa71518717&threadid=1805>
- [16] <http://www.theiet.org/forums/forum/messageview.cfm?catid=5&threadid=16690&enterthread=y>
- [17] <http://www.ecnmag.com/article.aspx?id=438&issue=1&menuid=552>
- [18] <http://www.usfirst.org/community/content.aspx?id=4190>
- [19] <mailto:evan.koblentz@advantagemedia.com>