

xPC Target 5.0

Perform real-time rapid control prototyping and hardware-in-the-loop simulation

xPC Target™ enables you to execute [Simulink](#)® and [Stateflow](#)® models on a target computer for rapid control prototyping, hardware-in-the-loop (HIL) simulation, and other real-time testing applications. It provides a library of I/O device drivers, a real-time kernel, and an interface for real-time monitoring, parameter tuning, and data logging.

xPC Target Turnkey combines xPC Target with a variety of high-performance, real-time target computers for a complete, fully assembled, real-time testing solution. You can program FPGA boards for xPC Target Turnkey systems using code generated by [Simulink HDL Coder](#)™.

Learn more about [xPC Target Turnkey](#).

Key Features

- Real-time execution of Simulink and Stateflow models on a target computer via an optimized real-time kernel
- Support for target computer hardware, including PMC, PCI, PCIe, cPCI, and PC104 form factors
- Blocks supporting numerous I/O modules, including analog I/O, digital I/O, pulse train generation and capture, and shared memory
- Blocks supporting communication protocols and data buses, including serial, UDP/IP, CAN, J1939, ARINC 429, and MIL-STD-1553
- Ability to program FPGA boards for xPC Target Turnkey systems (with Simulink HDL Coder)
- Tools for real-time monitoring, parameter tuning, and data logging
- Standalone operation with [xPC Target Embedded Option](#)
- APIs for developing user interfaces (Visual Basic, C/C++, Java, and .NET)



xPC Target Turnkey real-time testing solution. Once you connect to your hardware under test, you can run your Simulink and Stateflow models in real time and verify your designs.

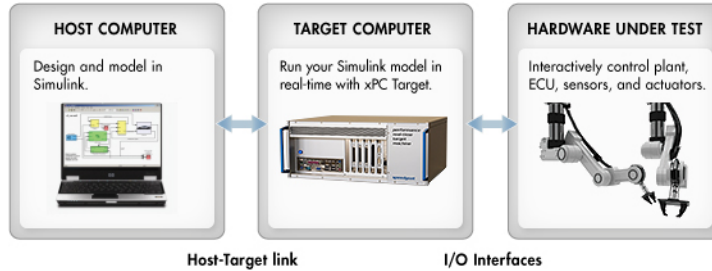
Creating a Real-Time Testing Environment

You create a real-time testing environment for [Simulink](#) models by connecting a host computer, a target computer, and your hardware under test. You connect the host computer running xPC Target, Simulink,

[Simulink Coder™](#), and a C compiler to the target computer via a single TCP/IP or RS-232 communications link. You then connect the target computer to your hardware under test and download code generated by Simulink Coder from a Simulink model to the target computer via the communications link.

Once you make the connections, you can:

- Access and interactively control the target computer and xPC Target application
- Tune parameters before, during, and after real-time execution
- Acquire, view, and log signal data



Components of an xPC Target real-time testing environment.

Interfacing with Target Computer Hardware

Using xPC Target in a real-time testing environment requires a target computer with I/O modules or protocol support. [xPC Target Turnkey](#) provides ready-to-use configurations, from which you can select a real-time target machine that meets the performance requirements of your real-time testing application. xPC Target Turnkey offers a variety of form factors and I/O modules suitable for desktop, laboratory, or in-vehicle real-time testing solutions.

xPC Target also includes [I/O drivers and functions that support additional target computer hardware and I/O boards](#) that you specify and purchase directly from the hardware manufacturer.



Ready-to-use xPC Target Turnkey real-time target machines in a variety of form factors suitable for desktop, lab, or in-vehicle environments.

Accessing and Controlling an xPC Target Application

You create an xPC Target application using xPC Target with [Simulink Coder](#) to automatically generate and compile a C/C++ code representation of a [Simulink](#) model. You then download the target application via a LAN (Ethernet) connection from the host computer to the target computer.

xPC Target enables you to access the target application and control it directly from the host computer using either the xPC Target Explorer tool or the [MATLAB®](#) command line. You can download your target application, start

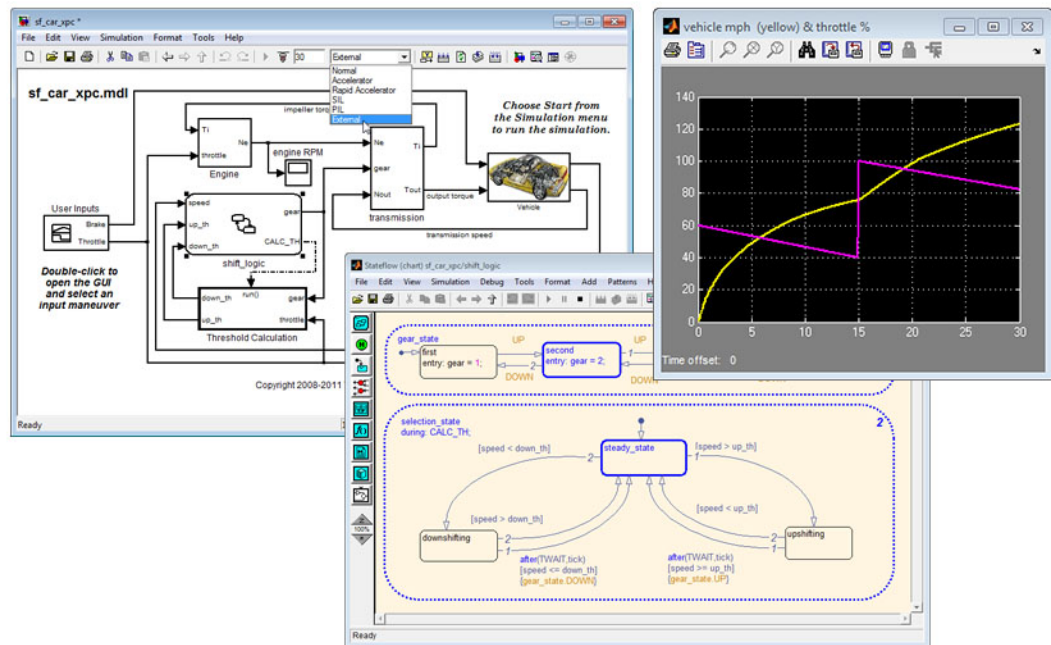
and stop real-time test execution, change the sample time and stop time, and modify other target application properties.

xPC Target also provides flexible APIs for MATLAB, .NET, C, and COM that let you programmatically control the target application running on the target computer.

Once you have a working xPC Target application, you can run the application in standalone mode using [xPC Target Embedded Option](#). In standalone mode, the xPC Target application automatically starts and executes on the target computer without requiring a host computer.

Tuning Parameters, Monitoring Signals, and Acquiring Data

xPC Target lets you tune and optimize parameter values before, during, and after real-time execution of models on the target computer using [Simulink](#) external mode, xPC Target Explorer, or the [MATLAB](#) command-line interface.



Using xPC Target via Simulink External Mode. You can work with xPC Target and the Simulink model (left) to control real-time operation, tune parameters, and view the results directly in Stateflow (middle) and in a Simulink Scope block (top right).

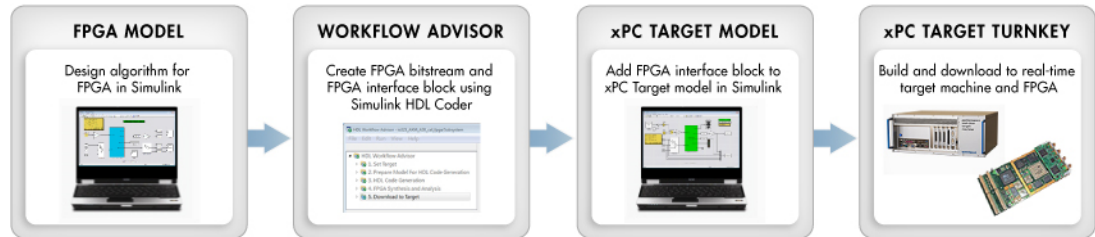
To monitor and acquire data, xPC Target includes scopes for both the host and target computers. Scopes support several trigger modes you can use to control the acquisition, timing, and duration of data collection. You can also display multiple signals in a single scope and attach multiple scopes to a single model.

Signal monitoring enables you to view signal values at the current sample rate. Signal tracing lets you capture, store, and display bursts of data, similar to the behavior of a digital oscilloscope. Signal logging lets you acquire and store signals during the entire test execution. You can then upload the logged data to the host computer for signal display, analysis, or archiving.

Programming FPGA Boards

Using code generated by [Simulink HDL Coder](#), you can automatically program FPGA boards within xPC Target Turnkey systems. You can build reconfigurable I/O or execute high-speed algorithms on an FPGA connected to a model running in real time with xPC Target.

You can use Simulink, Stateflow, or MATLAB function blocks to model the algorithm you want to run on the FPGA board. Once you are satisfied with the simulated results, the Simulink HDL Coder Workflow Advisor walks you through the process to instantiate your design, generate a bitstream for the selected FPGA, and create an xPC Target interface subsystem for programming and communicating with the FPGA. The interface handles the details of programming the FPGA (requiring no HDL experience), so you can focus on your real-time testing tasks.



Programming FPGA boards for xPC Target Turnkey real-time target machines using Simulink HDL Coder Workflow Advisor.

Resources

Product Details, Demos, and System Requirements

www.mathworks.com/products/xpctarget

Trial Software

www.mathworks.com/trialrequest

Sales

www.mathworks.com/contactsales

Technical Support

www.mathworks.com/support

Online User Community

www.mathworks.com/matlabcentral

Training Services

www.mathworks.com/training

Third-Party Products and Services

www.mathworks.com/connections

Worldwide Contacts

www.mathworks.com/contact