xPC Target Release Notes

The "xPC Target 2.0 Release Notes" on page 1-1 describe the changes introduced in the latest version of the xPC Target. The following topics are discussed in these Release Notes:

- "New Features" on page 1-2
- "Major Bug Fixes" on page 1-6
- "Known Software and Documentation Problems" on page 1-7

If you are upgrading from a release earlier than Release 12.1, you should also see these sections:

- "xPC Target 1.2 Release Notes" on page 2-1
- "xPC Target 1.1 Release Notes" on page 3-1

Printing the Release Notes

If you would like to print the Release Notes, you can link to a PDF version.

Contents

xPC Target 1.1 Release Notes

3

xPC Target 2.0 Release Notes

New Features

This section summarizes the new features and enhancements introduced in the xPC Target 2.0 and xPC Target Embedded Option 2.0.

Note xPC Target 2.0 incorporates changes introduced in xPC Target 1.3, which was initially released in Web-downloadable form after Release 12.1 was released, but before Release 13. These Release Notes describe those changes, as well as changes introduced after Version 1.3.

Note If you upgrade your xPC Target software from a previous version to 2.0, you need to recreate the target boot disk and you need to rebuild your xPC Target applications.

If you are upgrading from a release earlier than Release 12.1, then you should also see "New Features" on page 2-2.

xPC Target API

The xPC Target API is an open environment designed for a Windows operating system. It provides all of the information and accessibility you need to integrate with various development tools. You can use these development tools to develop and program a GUI application that connects with an xPC Target application.

The xPC Target API is distributed in two different libraries:

- **xpcapi.dll** — DLL written in C with the necessary functions for your GUI application to link to at run time rather than link to statically at compile time.
- **xpcapiCOM.dll** — Component Object Model DLL consisting of COM objects. You use these COM objects with your GUI application to control a target application.

A generated model specific COM DLL allows you to easy access preselected parameters and signals in your target application.

Check the xPC Target Product News Page at `http://www.mathworks.com/support/product/XP/productnews/productnews.shtml` for updated documentation on this feature.

Enhanced Data Logging and Tracing

You can now upload continuous data, without missing samples, while the target application is running. Use two or more host scopes with the new scope property `sc.TriggerSample`.

New Host PC GUI

xpcrctool (**R**emote **C**ontrol **Tool**) is a graphical user interface (GUI) running on the host PC. This GUI allows you to remotely connect from MATLAB on a host PC to a target application on a target PC, tune parameters, trace signals, and log data.

This GUI includes a new signal viewer for adding and removing signals from an xPC Target Scope.

Additional I/O Support

The following I/O support has been added:

- Standard IP modules
- CONTEC boards and drivers
- Increased NI board support
- National counter boards
- UEI drivers
- SBS shared memory

Additional Async Events Support

xPC Target now supports the Real Time Devices DM6804 board. You can use the board an interrupt source for generating an asynchronous event.

Fortran Support

xPC Target now supports Fortran for using S-functions in Simulink.

Check the xPC Target Product News Page at `http://www.mathworks.com/support/product/XP/productnews/productnews.shtml` for updated documentation on this feature.

Polling Mode

A new execution mode (Polling Mode) has been introduced in the xPC Target kernel that enables smaller execution times. You should not use this mode unless absolutely necessary, because it will cause you to lose all host-target communication during model execution. Consequently, parameter tuning, signal monitoring, etc. capabilities are lost in this mode.

RS232 Binary Drivers

New drivers have been added for RS-232 I/O that enable you to send and receive arbitrary binary data.

From/To xPC Target Blocks

It is now possible to automatically generate From xPC Target blocks and To xPC Target blocks from an existing Simulink model representing your xPC Target application. This is done by tagging the blocks you want to use the From/To xPC Target blocks with.

Data Logging/Scope Data Upload Is Faster

Uploading logged data or data from an xPC Target scope (of type `host`) is now faster than it was in xPC Target 1.2.

Scope Data is Uploadable When State Is Interrupted

If an xPC Target scope of type `host` is interrupted before it can acquire a whole buffer of data, it is now possible to upload the data it has acquired. The uploaded data will still be of the entire buffer size; the last few samples where the data was not acquired will be set to zero.

Support For I82559ER-based Ethernet Cards

Some (mostly in embedded form factors) PCs have Ethernet controllers based on the I82559ER Ethernet controller from Intel. These controllers are now supported.

Scope Data/Data Logging Buffers Accessible Through WWW Interface

Data from xPC Target scopes of type host are uploadable through the WWW interface, as well as the data logged (states, outputs, TET) during application execution. This data is in Comma Separated Variable (CSV) format, which can be read by most spreadsheet programs and also by MATLAB.

Scope ID Autoincrement

xPC Target scopes have to have a unique identifier. This identifier had to be entered manually in case you had two or more xPC Target scope blocks. This has been changed so that the scope ID is automatically incremented to an appropriate value.

Major Bug Fixes

xPC Target 2.0 includes several bug fixes made since Version 1.2. This section describes the particularly important Version 2.0 bug fixes.

If you are viewing these Release Notes in PDF form, please refer to the HTML form of the Release Notes, using either the Help browser or the MathWorks Web site and use the link provided.

Known Software and Documentation Problems

For a list of bugs reported in the previous release that remain open, see "Known Software and Documentation Problems" on page 2-4.

2

xPC Target 1.2 Release Notes

New Features

This section introduces the new features and enhancements added to xPC Target 1.2 and xPC Target Embedded Option 1.2 since Version 1.1 of those products (Release 12.0).

For information about xPC Target and xPC Target Embedded Option features that are incorporated from Version 1.0, see "New Features" on page 3-3.

C API

A beta version of the xPC Target C API is available from the Product News page at `http://www.mathworks.com/support/author/xpc/index.shtml`.

Use the C API to create stand-alone graphical user interfaces (GUIs) or console applications to interact with a real-time target application. xPC Target includes examples for Visual C/C++ and Visual BASIC.

UDP Driver Support

Communicate with another computer using User Datagram Protocol (UDP) packets. Add UDP driver blocks to your Simulink model and configure them for sending and receiving messages from another system.

The UDP driver blocks are not included on the R12.1 CD. Please check the Product News page at `http://www.mathworks.com/support/author/xpc/index.shtml` for the drivers when they become available.

Asynchronous Event (Interrupt) Support

Create subsystems that execute asynchronously when an event (interrupt) occurs.

These subsystems can communicate and be part of a larger model that executes with a monotonic step size.

We expect to further enhance the Asynchronous Event drivers currently available on the R12.1 CD. Please check the Product News page at `http://www.mathworks.com/support/author/xpc/index.shtml` for the enhanced version.

CAN FIFO Support

Use CAN FIFO model I/O drivers to either monitor an entire CAN network, or to minimize driver latency for certain applications.

100 Mbit/Second Ethernet Support

Use 10 or 100 megabit/second communication between the host and target computers for downloading real-time application and uploading signal data. The communication uses the TCP/IP protocol with an Ethernet card in both the host and target computers.

Fixed-Point Kernel Support

The xPC Target kernel runs on PCs (CPUs) that do not have a hardware floating-point unit. If needed, xPC Target uses a software floating-point emulator.

Increased Data Upload Speed

Upload log data about five times faster or better. Upload scope data about three times faster.

I/O Device Driver Support

xPC Target 1.2 includes new device drivers blocks:

- New blocks to support additional I/O boards
- Blocks to support a GPIB fieldbus using a National Instruments GPIB controller and an RS232 connection to the target PC
- Blocks to support CAN and CAN FIFO networks

Known Software and Documentation Problems

This section updates the xPC Target 1.2 and xPC Target Embedded Option 1.2 documentation set, reflecting known xPC Target and xPC Target Embedded Option software and documentation problems.

Uploading Data with External Mode

xPC Target does not support uploading data to normal Simulink scope blocks when using Simulink external mode. Instead, use xPC Target scope blocks or the xPC Target graphical user interface (GUI).

Target Command Line Interface

Visualizing or changing parameter values is limited to scalar parameters.

Memory-Mapped Devices

Some supported boards in the xPC Target I/O library are memory-mapped devices. These memory-mapped boards are accessed in the address space between 640K and 1M in the lower memory area. xPC Target reserves a 112 kB memory space for memory mapped devices in the address range

```
C0000 - DBFFF
```

Some drivers for memory-mapped devices allow you to select an address range supported by the device, but not supported by xPC Target. For example, the CAN drivers for Softing allow you to select memory ranges above DBFFF. Select a memory range supported by both the device and xPC Target.

Selecting a Working Directory Inside the MATLAB Root Directory

Before you run the command xpctest, select a current directory outside of the MABLAB root directory.

During the build process, Real-Time Workshop does not allow files to be saved within the MATLAB root. If you select a current directory within the MATLAB root, the xPC Target test procedure will fail when trying to build a target application.

3

xPC Target 1.1 Release Notes

Introduction to xPC Target and xPC Target Embedded Option

The xPC Target and xPC Target Embedded Option products were introduced as MathWorks products in Release 11.1.

These products have been updated between Release 11.1 and Release 12, as described in the "New Features" section that follows.

Note xPC Target 1.1 extends the functionality of the Real-Time Workshop. The xPC Target Embedded Option 1.1 in turn extends the functionality of the xPC Target and requires an additional licence from The MathWorks.

---

xPC Target

xPC Target is a host-target PC solution for prototyping, testing, and deploying real-time systems. It is an environment where the host and target computers are different computers.

In this environment you use your desktop PC as a host computer with MATLAB, Simulink, and Stateflow (optional) to create models using Simulink blocks and Stateflow diagrams. After creating a model, you can run simulations in nonreal-time.

You can than use your host computer with Real-Time Workshop®, Stateflow Coder (optional) and a C compiler to create executable code. After creating the executable code, you can run your target application in real time on a second PC compatible system.

xPC Target Embedded Option

The xPC Target Embedded Option requires an additional license from The MathWorks.

This option allows you to boot the target PC from a device other than a floppy disk drive such as a hard disk drive or flash memory. It also allows you to create stand-alone applications on the target PC independent from the host PC.

New Features

This section introduces the new features and enhancements added to xPC Target 1.1 and xPC Target Embedded Option 1.1 since xPC Target 1.0 (Release 11.1).

Web Browser Interface

If the target PC is connected to a network, you can use a Web browser to interact with the target application from any computer connected to a network. Currently, this feature is limited to one browser connection at a time. xPC Target supports Netscape Navigator 4.5, Microsoft Internet Explorer 4.0 and later versions.

Target PC Command Line Interface

You can interact with the xPC Target environment through the target PC command window. Enter most of the xPC Target commands in the command window on the target PC. This interface is useful with stand-alone applications that are not connected to your host PC.

MATLAB Command Line Interface

The behavior for the commands `getparamid` and `getsignalid` has been changed. The default behavior is to return the parameter or signal name (P0, P1 . . . or S0, S1, . . .), and you can also return the parameter or signal index (0, 1, 2 . . .) by setting an argument flag.

The behavior for the command `getsignalid` in xPC Target 1.1 is different from xPC Target 1.0 and may break scripts that use this command. The default behavior for the command `getsignalid` with Version 1.0 was to return the signal index.

Signal Monitoring

This is the process for acquiring signal data without time information. The advantage of this process is that there is minimal CPU overhead for collecting the data.

I/O Device Driver Support

xPC Target 1.1 includes new device drivers blocks:

- New blocks to support additional I/O boards
- Blocks to support a GPIB fieldbus using a National Instruments GPIB controller and an RS232 connection to the target PC

Known Software and Documentation Problems

This section updates the xPC Target 1.1 documentation set, reflecting known xPC Target 1.1 software and documentation problems.

Uploading Data with External Mode

xPC Target does not support uploading data to normal Simulink scope blocks when using Simulink external mode. Instead, use xPC Target scope blocks or the xPC Target graphical user interface (GUI).

Target Command Line Interface

Visualizing or changing parameter values is limited to scalar parameters.

Memory-Mapped Devices

Some supported boards in the xPC Target I/O library are memory-mapped devices. These memory-mapped boards are accessed in the address space between 640K and 1M in the lower memory area. xPC Target reserves a 112 kB memory space for memory mapped devices in the address range

```
C0000 - DBFFF
```

Some drivers for memory-mapped devices allow you to select an address range supported by the device, but not supported by xPC Target. For example, the CAN drivers for Softing, allow you to select memory ranges above DBFFF. Select a memory range supported by both the device and xPC Target.