

# xPC Target Release Notes

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The “xPC Target 2.7.2 Release Notes” on page 1-1 describe the changes introduced in the latest version of xPC Target. The following topics are discussed in these release notes.

- “New Features” on page 1-2
- “Upgrading from an Earlier Release” on page 1-3
- “Known Limitations” on page 1-4
- “Major Bug Fixes” on page 1-7

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

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The xPC Target Release Notes also provide information about recent versions of the product, in case you are upgrading from a version that was released prior to Release 14SP2.

- “xPC Target 2.7 Release Notes” on page 2-1
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## Printing the Release Notes

If you would like to print the release notes, you can link to a PDF version.



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## New Features

This section introduces the new features and enhancements added since Version 2.7.1 (Release 14 Service Pack 1+).

### xPC Target Explorer

xPC Target Explorer has been enhanced and now fully supports the following

- Inlined parameters
- Monitoring of test-pointed Stateflow<sup>®</sup> states.

### I/O Device Driver Support

xPC Target 2.7.2 has new driver blocks, including support for the following board:

<b>Manufacturer</b>	<b>Board</b>
National Instruments	PXI-6052E

The drivers for the following have been updated.:

<b>Manufacturer</b>	<b>Boards</b>
Contec	Contec DA12-16(PCI)
Measurement Computing	CIO-DAS16JR/16

## Upgrading from an Earlier Release

This section describes the upgrade issues involved in moving to xPC Target 2.7.2 from Version 2.7.1 or earlier.

### **Recreate Target Boot Disk and Rebuild Applications**

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

### **Watcom C/C++ Version 10.6 Compiler**

xPC Target no longer supports the Watcom C/C++ Version 10.6 compiler. xPC Target only supports Watcom C/C++ Version 11.0 and Microsoft compilers.

### **To/From Block**

To use existing models with these blocks, you must set the Real-Time Workshop parameter **RTW system** target file to `xpctarget.tlc` before running them. Note that the `xpcsliface` command behavior does not change.

## Known Limitations

This section describes known limitations with xPC Target.

### **C++ Language Support**

Real-Time Workshop 6.2 introduces support for generating C++ code. xPC Target does not yet support this feature.

### **Model Reference and xPC Target Parameters**

If you download a target application to a target PC, and that target application was built from a model containing referenced models, you cannot tune the parameters on any of the models. This is a limitation of Real-Time Workshop.

### **xPC Target Allows Up to Eight Scopes of Type File**

xPC Target allows up to eight scopes of type file. It allows up to ten scopes each of type target and host.

### **Serial Connection Baud Rate Limitation**

If you have a serial connection between your host PC and target PC, and you use a baud rate that is less than the maximum possible baud rate, you might experience communication failures. If you do experience these failures, use a baud rate greater than 19200.

### **External Mode**

The following are notes on using 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 Explorer (xpcexplr).
- External mode is only supported with the default target PC.

### **Watcom C/C++ Compiler**

You cannot use the Watcom compiler for models that contain Condor blocks. Use a Microsoft compiler instead.

## Real-Time Workshop Embedded Coder Support

xPC Target only supports Real-Time Workshop Embedded Coder for Microsoft compilers. It does not support Real-Time Workshop Embedded Coder for Watcom compilers.

## DOSLoader Mode and Model Sizes

Some target PCs might not boot if you try to boot them with a boot disk configured for DOSLoader mode and a maximum model size of 16 MB. If you encounter this problem, create a new boot disk with a different configuration, for example, DOSLoader mode and a maximum model size of 1 MB or 4 MB.

## xpcserialbinarysplit Model

The xPC Target model, `xpcserialbinarysplit.mdl`, does not work correctly. The constants defining the messages that are sent do not match the constants in the receive binary header block. This prevents the messages from being decoded. As a workaround, to send the messages that are being looked for, perform the following modifications:

- 1 In the MATLAB Command Window, open the `xpcserialbinarysplit.mdl`. Type `xpcserialbinarysplit`
- 2 Double-click the Constant block and change the **Constant value** parameter to `[3 5 170 1]`.
- 3 Double-click the Constant3 block and change the **Constant value** parameter to `[3 170 2 44]`.
- 4 Save and close the model to another name, for example `xpcserialbinarysplit2.mdl`

Use this model instead of `xpcserialbinarysplit.mdl`. These changes allow the associated message to be decoded.

## **Numerical Formats for Scopes of Type Target**

The numerical format for scopes of type target only display the default numeric format (floating point %15.6f). These scopes will ignore all other format requests.



## Major Bug Fixes

The xPC Target Version 2.7.2 includes important bug fixes made since Version 2.7.1. You can see a list of major Version 2.7.2 bug fixes on the MathWorks Web site.

If you are viewing these release notes in PDF form on the MathWorks Web site, please refer to the HTML form of the release notes on the MathWorks Web site and use the link provided.

If you are upgrading from a version earlier than Version 2.7.2, then you should see “Major Bug Fixes” on page 2-9 in the Version 2.7 Release Notes.



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## New Features

This section introduces the new features and enhancements added since Version 2.6.1 (Release 14 Service Pack 1).

### xPC Target Explorer

**xPC Target Explorer** has been enhanced and now fully supports the following

- Scopes of type file
- Access to target PC file systems
- Ability to export and import target PC environments
- Designating a default target PC
- Ability to view PCI device information

See the xPC Target Getting Started and User's Guide documentation for details.

### Default Target PC

This release of xPC Target introduces the concept of a default target PC and multiple target PCs to help you work with **xPC Target Explorer**, command-line interface objects, and the build process. External mode is only supported with the default target PC. See the xPC Target Getting Started documentation for details.

### To/From Blocks and Default Target PCs

In previous releases, you could build models that contained From/To xPC Target blocks without setting the Real-Time Workshop<sup>®</sup> parameter **RTW system** target file to `xpctarget.tlc`. To accommodate the use of multiple target PCs, you now must perform the following to run a model that contains From/To xPC Target blocks:

- Configure the Real-Time Workshop parameter **RTW system** target file for the model. Set this value to `xpctarget.tlc`. You access this dialog from the Simulink<sup>®</sup> model **Simulation -> Configuration Parameters** menu.
- Specify the correct target PC environment on the **xPC Target options** node of the Real-Time Workshop parameters dialog. In particular, either select the **Use default target PC** or enter the target name of the target PC to which

you want to connect. If you have only one target PC, the model uses the default target PC and you do not to perform this configuration.

## Stateflow® State Test Points

xPC Target now supports the monitoring of test pointed Stateflow states. This is available only through the MATLAB® command-line interface. It is not yet supported by **xPC Target Explorer** or xPC Target Scope blocks.

## xPC Target COM API

To support target PC file systems, the xPC Target COM API has been enhanced to support a new object, `xPCFileSystem`. To support this object, the following methods were added:

- `CD`
- `CloseFile`
- `GetFileSize`
- `Init`
- `MKDIR`
- `OpenFile`
- `PWD`
- `ReadFile`
- `RemoveFile`
- `RMDIR`
- `ScGetFileName`
- `ScGetWriteMode`
- `ScGetWriteSize`
- `ScSetFileName`
- `ScSetWriteMode`
- `ScSetWriteSize`
- `WriteFile`

## Obsolete Tools

The following tools are obsolete and have been removed from xPC Target:

- `xpcrcctool`
- `xpcsetup`
- `xpcscope`

- xpctgscope

Use **xPC Target Explorer** to perform the same activities.

### I/O Device Driver Support

xPC Target 2.7 has new driver blocks, including support for the following boards:

<b>Manufacturer</b>	<b>Boards</b>
National Instruments	PCI/PXI-6602
Adlink	6208A
Commtech	Fastcom 422/2-PCI
UEI	PD2-DIO-64 series, PDL-DIO-64 series, PDXI-DIO-64 series
Quatech	DSCP-200/300

The drivers for the following have been updated.

<b>Manufacturer</b>	<b>Boards</b>
General Standards	ADADIO
Measurement Computing	PCI-DAS1602/12 D/A
Sensoray	626

In addition, the RS-232 sublibrary has changed:

- FIFO read and write blocks have been added to support all RS-232 sublibrary composite drivers.

### xPC Target Demos

The following demos have been added to the xpcdemos directory:

- udphost.mdl

- `udphostpost.mdl`
- `udpseendreceiveA.mdl`
- `udpseendreceiveB.mdl`
- `udptarget.mdl`
- `udpxpctargetsteam.m`
- `xpcserialasciisplit.mdl`
- `xpcserialasciitest.mdl`
- `xpcserialbinarysplit.mdl`
- `xpcserialbinarytest.mdl`

# Upgrading from an Earlier Release

This section describes the upgrade issues involved in moving to xPC Target 2.7 from Version 2.6.1 or earlier.

## Recreate Target Boot Disk and Rebuild Applications

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

## Watcom C/C++ Version 10.6 Compiler

xPC Target no longer supports the Watcom C/C++ Version 10.6 compiler. xPC Target only supports Watcom C/C++ Version 11.0 and Microsoft compilers.

## To/From Block

To use existing models with these blocks, you must set the Real-Time Workshop parameter **RTW system** target file to `xpctarget.tlc` before running them. Note that the `xpcs1iface` command behavior does not change.



## Known Limitations

This section describes known limitations with xPC Target.

### **Model Reference and xPC Target Parameters**

If you download a target application to a target PC, and that target application was built from a model containing referenced models, you cannot tune the parameters on any of the models. This is a limitation of Real-Time Workshop.

### **xPC Target Allows Up to Eight Scopes of Type File**

xPC Target allows up to eight scopes of type file. It allows up to ten scopes each of type target and host.

### **Serial Connection Baud Rate Limitation**

If you have a serial connection between your host PC and target PC, and you use a baud rate that is less than the maximum possible baud rate, you might experience communication failures. If you do experience these failures, use a baud rate greater than 19200.

### **External Mode**

The following are notes on using 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 Explorer (xpcexplr).
- External mode is only supported with the default target PC.

### **Watcom C/C++ Compiler**

You cannot use the Watcom compiler for models that contain Condor blocks. Use a Microsoft compiler instead.

### **Real-Time Workshop Embedded Coder Support**

xPC Target only supports Real-Time Workshop Embedded Coder for Microsoft compilers. It does not support Real-Time Workshop Embedded Coder for Watcom compilers.

### **DOSLoader Mode and Model Sizes**

Some target PCs might not boot if you try to boot them with a boot disk configured for DOSLoader mode and a maximum model size of 16 MB. If you encounter this problem, create a new boot disk with a different configuration, for example, DOSLoader mode and a maximum model size of 1 MB or 4 MB.

### **United Electronics Industries PD2-AO-96**

The PD2-AO-96 driver does not work correctly in this release.

## Major Bug Fixes

xPC Target 2.7 includes several bug fixes made since Version 2.6.1. This section describes the particularly important Version 2.7 bug fixes.

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



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## New Features

This section introduces the new features and enhancements added since version 2.6 (Release 14+).

### **xPC Target Explorer**

This release includes the first officially supported version of the xPC Target Explorer. It is a graphical user interface for xPC Target. It provides a single point of contact for almost all xPC Target interactions, including:

- Configure the host PC for xPC Target
- Add and configure target PCs for xPC Target
- Create boot disks for particular target PCs
- Connect the target PCs for your xPC Target system to the host PC
- Download a prebuilt target application, .dlm, to a target PC
- Build a target application for a specific target PC
- Start and stop the application that has been downloaded to the target
- Add scopes of type host, target, and file to the downloaded target application
- Monitor signals
- Add and remove signals to the xPC Target scopes
- Start and stop scopes
- Adjust parameter values for the signals while the target application is running

The xPC Target Explorer GUI runs on your xPC Target host machine.

Use xPC Target Explorer to perform xPC Target activities. This tool encompasses the functionality of `xpcsetup`, `xpcrc tool`, `xpcscope`, and `xpctgscope`. Note that in a future release, `xpcrc tool`, `xpcscope`, and `xpctgscope` will be obsoleted.

See the xPC Target Getting Started and User's Guide documentation for details on xPC Target Explorer.

## File Systems and Multiple Targets

The xPC Target file system and FTP feature now support the concept of multiple targets. You can now specify which target PC to work with when using the file system or file object. In support of this, the `xpctarget.fs` and `xpctarget.ftp` constructors have changed to support an interface to that used by the `xpctarget.xpc` constructor.

## xPC Target Support for Vector CANape (Beta)

xPC Target now enables your target application data to be accessed by a Vector CANape system, Version 5.00.20 and 5.00.30. See the Vector CANape chapter in the xPC Target I/O Reference Guide for further details.

This release is a Beta version of this support. The MathWorks encourages you to use this new feature and provide feedback.

## Dials & Gauges Blockset

References to the Dials & Gauges Blockset have been removed from the xPC Target documentation. As a result, the xPC Target documentation no longer describes the use of the Dials & Gauges Blockset. In particular, the “Graphical User Interfaces” chapter of the xPC Target User’s Guide documentation no longer describes this blockset.

Additionally, relevant xPC Target demos now only use the Gauges Blockset.

## Changes from the Previous Release

The behavior of source block dialog boxes have changed as follows:

- Opening a dialog box for a source block causes Simulink to pause. While Simulink is paused, you can edit the parameter values. You must close the dialog box to have the changes take effect and allow Simulink to continue.  
In particular, hardware input blocks in the xPC Target library (blocks that acquire data from hardware) are affected by this change.
- The xPC Target Explorer no longer supports changing tunable source block parameters while a simulation is running. You will find all such parameter fields disabled while a simulation is running.



## Upgrading from an Earlier Release

This section describes the upgrade issues involved in moving to xPC Target 2.6 from Version 2.5.

### **Recreate Target Boot Disk and Rebuild Applications**

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

### **Watcom C/C++ Version 10.6 Compiler**

xPC Target no longer supports the Watcom C/C++ version 10.6 compiler. xPC Target only supports Watcom C/C++ version 11.0.

## Known Limitations

This section describes known limitations with xPC Target.

### **Model Reference and xPC Target Parameters**

If you download a target application to a target PC, and that target application was built from a model that contains referenced models, you cannot tune the parameters on any of the models. This is a limitation of Real-Time Workshop.

### **xPC Target Allows Up to Eight Scopes of Type File**

xPC Target allows up to 8 scopes of type file. It allows up to 10 scopes each of type target and host.

### **Target PC Disconnects and MATLAB**

If communication is disrupted after a connection has been established between your host PC and a target PC, MATLAB might enter a prolonged timeout loop waiting for the target PC to respond. Communication might be lost for a number of reasons, for example, external target PC hardware issues or cable disconnections.

The quickest way to recover MATLAB is to reboot the target PC in question.

### **Serial Connection Baud Rate Limitation**

If you have a serial connection between your host PC and target PC, and you use a baud rate that is less than the maximum possible baud rate, you might experience communication failures. If you do experience these failures, use a baud rate greater than 19200.

### **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 Explorer (xpcexplr).

### **Watcom C/C++ Compilers**

You cannot use a Watcom compiler for models that contain Condor blocks. Use a Microsoft compiler instead.

## **Real-Time Workshop Embedded Coder Support**

xPC Target only supports Real-Time Workshop Embedded Coder for Microsoft compilers. It does not support Real-Time Workshop Embedded Coder for Watcom compilers.

## **DOSLoader Mode and Model Sizes**

Some target PCs might not boot if you try to boot them with a boot disk configured for DOSLoader mode and a maximum model size of 16 MB. If you encounter this problem, create a new boot disk with a different configuration, for example, DOSLoader mode and a maximum model size of 1 MB or 4 MB.

## **Docked Figures and xPC Target Explorer**

A problem in the ability of MATLAB to host Active X controls inside docked figures prevents xPC Target Explorer from supporting the docking feature. Docking has been disabled for the xPC Target Explorer window in this release.

### Major Bug Fixes

xPC Target 2.6.1 includes several bug fixes made since the library update Version 2.6. This section describes the particularly important Version 2.6.1 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.

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## New Features

xPC Target 2.6 is a Web download release. This section introduces the new features and enhancements added since version 2.5 (Release 14).

### **xPC Target Explorer (Beta)**

This release includes a Beta version of the xPC Target Explorer. It is a graphical user interface for xPC Target. It provides a single point of contact for almost all xPC Target interactions, including:

- Configure the host PC for xPC Target
- Add and configure target PCs for xPC Target
- Create boot disks for particular target PCs
- Connect the target PCs for your xPC Target system to the host PC
- Download a prebuilt target application, .dlm, to a target PC
- Build a target application for a specific target PC
- Start and stop the application that has been downloaded to the target
- Add scopes of type host, target, and file to the downloaded target application
- Add and remove signals to the xPC Target scopes
- Start and stop scopes
- Adjust parameter values for the signals while the target application is running

The xPC Target Explorer GUI runs on your xPC Target host machine.

Use xPC Target Explorer to perform xPC Target activities. This tool encompasses the functionality of both `xpcsetup` and `xpcrcctool`. This is the Beta release of the xPC Target Explorer. The MathWorks encourages you to use this new interface and provide feedback.

See the xPC Target Getting Started and User's Guide documentation for details on xPC Target Explorer.

### **Real-Time Workshop® Embedded Coder Support**

xPC Target now supports the Real-Time Workshop Embedded Coder. This feature requires the Real-Time Workshop Embedded Coder.

## **CAN Library Link Change**

The mechanism used to link the external CAN libraries has changed. It is no longer necessary to select a CAN library via a list in `xpcsetup` or `xpcexplr` to be able to use CAN blocks in a model. Instead the link will be set up automatically. xPC Target will ignore user-defined settings.

## **xPCGetSignals API Function**

The `xPCGetSignals` API function can now return the values of a vector of up to 1000 signals as fast as it can acquire them. This was previously limited to 10 signals.

## **I/O Device Driver Support**

xPC Target 2.6 has new driver blocks, including support for the following boards

- Condor (for the aerospace industry)
  - CEI-520, CEI-520A

Contact your MathWorks representative if you are interested in support for the boards CEI-620, CEI-820, and CEI-820TX.
- Contec
  - ADI12-16
- National Instruments
  - PCI-6601 Armed Pulse Generation
  - PCI/PXI-6602 Armed Pulse Generation
- Sensoray
  - Sensoray626

The following drivers have been updated

- Measurement Computing PCI-CTR05
- Sensoray 526 Encoder Input block
- Diamond Systems MM-32-AT Frame Analog Input block

### **xPC Target Support for Vector CANape (Beta)**

xPC Target now enables your target application data to be accessed by a Vector CANape system, Version 5.00.20 and 5.00.30. See the Vector CANape chapter in the xPC Target I/O Reference Guide for further details.



## Upgrading from an Earlier Release

This section describes the upgrade issues involved in moving to xPC Target 2.6 from Version 2.5.

### **Recreate Target Boot Disk and Rebuild Applications**

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

## Known Limitations

This section describes known limitations with xPC Target.

### **Model Reference and xPC Target Parameters**

If you download a target application to a target PC, and that target application was built from a model that contains referenced models, you cannot tune the parameters on any of the models. This is a limitation of Real-Time Workshop.

### **Target PC Disconnects and MATLAB**

If communication is disrupted after a connection has been established between your host PC and a target PC, MATLAB might enter a prolonged timeout loop waiting for the target PC to respond. Communication might be lost for a number of reasons, for example, external target PC hardware issues or cable disconnections.

The quickest way to recover MATLAB is to reboot the target PC in question.

### **Serial Connection Baud Rate Limitation**

If you have a serial connection between your host PC and target PC, do not use a baud rate less than 19200.

### **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 Explorer (xpcexplr).

### **Watcom C/C++ Version 10.6 Compiler**

The following are limitations with the Watcom C/C++ Version 10.6

- If you use interrupts in your target application, or if you use the IRQ Source block from the Asynchronous Event sublibrary, do not use the Watcom C/C++ Version 10.6 compiler. You will get an error. Use another supported compiler, such as Watcom C/C++ Version 11.0.

- If your model contains PC 104 CAN blocks, you cannot compile the target application with Watcom C/C++ Version 10.6. Use another supported compiler, such as Watcom C/C++ Version 11.0.

### **Watcom C/C++ Compilers**

xPC Target only supports models that contain Condor blocks for Microsoft compilers. It does not support models that contain Condor blocks for Watcom compilers.

### **Real-Time Workshop Embedded Coder Support**

xPC Target only supports Real-Time Workshop Embedded Coder for Microsoft compilers. It does not support Real-Time Workshop Embedded Coder for Watcom compilers.

### Major Bug Fixes

xPC Target 2.6 includes several bug fixes made since the library update Version 2.5. This section describes the particularly important Version 2.6 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.

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## New Features

This section summarizes the new features and enhancements introduced in the xPC Target 2.5 since Version 2.0.2.

### **xPC Target Explorer (Beta)**

This release includes a Beta version of the xPC Target Explorer. It is a graphical user interface for xPC Target. It provides a single point of contact for almost all xPC Target interactions, including:

- Configure the host PC for xPC Target
- Add and configure target PCs for xPC Target
- Create boot disks for particular target PCs
- Connect the target PCs for your xPC Target system to the host PC
- Download a prebuilt target application, .d1m, to a target PC
- Build a target application for a specific target PC
- Start and stop the application that has been downloaded to the target
- Add scopes of type host, target, and file to the downloaded target application
- Add and remove signals to the xPC Target scopes
- Start and stop scopes
- Adjust parameter values for the signals while the target application is running

The xPC Target Explorer GUI runs on your xPC Target host machine.

You can use xPC Target Explorer or your usual xPC Target interfaces to perform xPC Target activities. This is the Beta release of the xPC Target Explorer. The MathWorks encourages you to use this new interface and provide feedback.

See the xPC Target User's Guide documentation for details on xPC Target Explorer.

## Registering Active X Controls

Associated with the xPC Target Explorer is a new script, `xpc_register_ocx`. If you are running MATLAB remotely (accessing MATLAB over the network), run this script to register Active X controls before you start xPC Target Explorer.

## Multiple Targets

xPC Target now supports concurrent use of more than one target from a single host. In conjunction with this, the `xpc` method has been updated to accept the different communication types ('RS232' or 'TCP/IP'). See the xPC Target User's Guide documentation for details.

## Real-Time Data Acquisition to Files on Target PC

xPC Target supports a new scope type of `file`. This new scope type enables you to acquire signal data in real time and store it to a file on the target PC. Using the new file objects and methods, you can then retrieve the file data to the host to plot or otherwise analyze the signal data. You do not need to have a target application loaded on the target PC before accessing the target PC file system.

To support this new capability, xPC Target now also provides:

- A file system on the target PC
- FTP and file system objects that enable you to work with files on the target PC file system
- Basic file transfer methods
- Basic file system methods
- File system API

This functionality is limited to file systems of type FAT-12, FAT-16, or FAT-32.

See the following chapters of the xPC Target documentation:

xPC Target User's documentation: Targets and Scopes in the MATLAB Interface; Signals and Parameters; Working with Target PC Files and File Systems; and Function Reference.

Getting Started with xPC Target documentation: Basic Tutorial.

xPC Target API Reference Guide documentation: API Function and Method Reference.

## Numeric Precision in Host/Target Communications

To improve numeric precision, the format of xPC Target host PC to target PC messaging has been converted to binary mode. This implies the transfer of the full binary image of data values during xPC Target interactions such as signal monitoring and parameter tuning.

## C and COM API

You no longer need to purchase xPC Target Embedded Option to create stand-alone GUI applications with the xPC Target C or COM API. See the xPC Target API Reference Guide documentation for reference pages for the C and COM API functions and methods.

To deploy a GUI application to other host PC systems that do not have your licensed copy of xPC Target, you need the xPC Target Embedded Option. If you do not have the xPC Target Embedded Option and would like to deploy your GUI application, contact your MathWorks representative.

In support of this new feature, xPC Target provides the following new demos in the C:\<MATLAB root>\toolbox\rtw\targets\xpc\api directory. These demos illustrate how to use the xPC Target COM API to create custom stand-alone GUI applications.

- VBNET\SigsAndParamsDemo\Demo.sln — Contains all the Visual Basic .NET files to run the windows form application. This demo is a functional application that you can use as a template to create your own custom GUIs.
- VisualBasic\Models\sf\_car\_xpc — Contains all the relevant files for the sf\_car\_xpc demo, including the Visual Basic project files and the model file (sf\_car\_xpc.mdl) and DLM file (sf\_car\_xpc.dlm) for which the demo is written.
- tc1tk — Contains Tcl/Tk demo scripts that illustrate how to directly access xPC Target COM API functions through a command-line interpreter like Tcl/Tk.

## COM API GetParam Syntax Change

The GetParam method now returns the correct size of elements returned. In earlier versions, this method required you to provide an element size.



## Support for Model Referencing

xPC Target now supports the new Model block from Simulink. This block allows one model to include another model as if it were a block. This feature, called model reference, works by generating code for included models that the parent model executes from a binary library file. See the Real-Time Workshop Release Notes for further information. When using model referencing with xPC Target, note the following **Configuration Parameter** parameter setting requirements:

- In the Real-Time Workshop node, ensure that the **RTW system target file** parameter for both the top and referenced models is **xpctarget.tlc**.
- In the Solver node, ensure that the **Solver** settings for both the top and referenced models match.

## Run-Time Parameters

xPC Target provides the following target object methods to enable you to save run-time parameters for your target application. These parameters are those you would like to save for reuse, such as those for parameter tuning. See the xPC Target User's Guide documentation for details:

- saveparamset
- loadparamset

In conjunction, the following API functions enable the same feature. See the xPC Target API Reference Guide documentation for details:

- xPCSaveParamSet
- xPCLoadParamSet

## Inlined Parameters

xPC Target now supports the use of inlined parameters from Real-Time Workshop.

## Configuration Parameters xPC Target Options Dialog

In previous releases, the Simulink model **Configuration Parameters** dialog contained the xPC Target options in two panes. The xPC Target options are now contained in one pane, available as a node in the Real-Time Workshop tree. The functionality of the dialog is otherwise identical.

## RS-232, RS-422, and RS-485 Add-on Board Drivers

New drivers have been added for serial communication support:

- RS-232 — QSC-100 and ESC-100 PCI boards from Quatech
- RS-422, RS-485 — QSC-200/300 boards from Quatech
- RS-232, RS-422, RS-485 — Emerald-MM and Emerald-MM-8 PC/104 boards from Diamond Systems. These boards provide 4 and 8 serial ports, respectively. These boards are jumper-configurable for the protocols.

xPC Target provides a set of functionally similar drivers for these boards. See Serial Communication of the xPC Target I/O Reference documentation for a description of the new driver blocks.

## Number of Available UDP Blocks Increase

The number of available UDP blocks per model has been increased. You can now have up to 32 UDP blocks in any given model (any combination of Send and Receive blocks).

## xPC Target Methods and Parameters

The following enhancements have been made to xPC Target methods and parameters:

- Parameters are no longer target object properties. You can no longer use the `setparamid` function to set parameter IDs, nor can you use the `set` or `get` function to get or set parameter values. For example, commands like the following no longer work:

```
tg.P1  
tg.P1=5
```

Instead, use the new methods, `getparam` and `setparam`.

- Signals are no longer target object properties. You can no longer use the `get` function to get signal values. For example, a command like the following no longer works:

```
tg.S1
```

Instead, use the new method, `getsignal`.

- After setting new parameters with `setparam`, you can now revert values back to preceding ones with the `parIndexVec` structure.
- The target method, `xpc`, now allows you to establish communication with multiple target PCs.

These changes require you to update any xPC Target scripts or M-files that refer to these methods, parameters, or properties. Your existing scripts and M-files will no longer run on xPC Target otherwise.

See the xPC Target User's Guide documentation for details.

## xPC Target Scopes

The following enhancements have been made to xPC Target scopes:

- xPC Target now supports 10 scopes of each scope type for a maximum of 30 scopes. In prior releases, xPC Target supported a total of 10 scopes.
- Scopes created by xPC Target Scope blocks now acquire data according to Simulink sample time rules. In previous releases, scopes created by xPC Target Scope blocks acquired data at the base sample rate of the model, regardless of the sample time of their input signal. This includes non-regular execution, such as if the scope is in an enabled or triggered subsystem. Note that Scopes created dynamically from the MATLAB Command Window behave as before.

## To xPC Target and From xPC Target Blocks

The behavior when you double-click the To xPC Target and From xPC Target blocks has changed. If you double-click a To xPC Target or From xPC Target block that has been properly configured, the target parameter or signal that the block refers to is highlighted. If the To xPC Target or From xPC Target block has not yet been configured, double-clicking the block has no effect. In previous releases, double-clicking on these blocks displayed the **Block Parameters** dialog for the block.

To edit the block parameters for the To xPC Target or From xPC Target blocks, right-click on the block and select **Mask parameters**.

## **xPC Target From File Block**

xPC Target has a new block, From File. This block reads data from a file on the target PC hard disk and distributes that data in chunks every sample time. As the xPC Target kernel on the target PC reads the file data, it writes that data into a software buffer whose size is user-defined.

## **I/O Device Driver Support**

xPC Target 2.5 has new driver blocks, including support for the following boards

- Adlink
  - PCI-8133
- Contec
  - CNT24-4D
- Diamond
  - Garnet-MM
  - Diamond-MM-16
  - Diamond-32-AT Frame A/D
  - Emerald-MM
  - Emerald-MM-8
  - Onyx-MM-DIO
  - Prometheus
- National Instruments
  - PXI-6071E
  - PCI-6601
  - PCI-6602
  - PCI/PXI-6711
  - PCI/PXI-6713
- North Atlantic Industries
  - PCI-76CS1

- PCI-76CL1
- PCI-76LD1
- 73SD3
- Quanser
  - Q8
- Quatech
  - QSC-100
  - ESC-100
  - QSC-200/300
- Real Time Devices
  - DM6816
- Sensoray
  - Sensoray526
- VMIC
  - VMIC VMICPCI-5565 (previously released as part of the xPC Target Release 2.0.2 library update)

Some xPC Target 2.5 driver blocks have been updated, including

- The SBS and Systran shared memory blocks have been updated to better coincide with the VMIC shared memory blocks.
- All Diamond-MM blocks have been renamed to MM. If you have existing models with blocks named Diamond-MM, replace those blocks with the renamed equivalents.
- Diamond-MM A/D, D/A, DI, and DO blocks have parameter changes.
- The General Standards PCM-ADADIO block has been updated.
- Support for the following National Instruments boards has been enhanced:
  - PCI-6023E
  - PCI-6024E
  - PCI-6025E
  - PCI-6031E
  - PCI-6052E
  - PCI-6071E

- PCI-MIO-16E-1
- PCI-MIO-16E-4
- PCI-MIO-16XE-10
- PCI-6040E
- PXI-6070E
- Support for the following UEI boards has been enhanced:
  - PD2-MF
  - PD2-MFS
  - PDXI-MF
  - PDXI-MFS
  - PD2-AO
- The following National Instruments drivers have been renamed:
  - PCI-MIO-16E-10, renamed to PCI-6030E
  - PCI-MIO-16E-4, renamed to PCI-PCI-6040E
  - PCI-MIO-16E-1, renamed to PCI-6070E
- The CIO-QUAD02, CIO-QUAD04, and PCI-QUAD04 Incremental Encoders now have a **Filter prescale factor**, which helps eliminate high frequency noise.
- The Softing board drivers have been updated.

## Obsolete Device Drivers

xPC Target has obsoleted the drivers for the following manufacturers:

- Burr-Brown
- Gespac

You can still access these driver blocks by typing the command `xpcobsolete1ib` at the MATLAB Command Window. Existing models that use these drivers will still work. However, their presence is not guaranteed for future releases. Do not use these driver blocks in new models.

In addition, in the xPC Target library (`xpc1ib`), there are new versions of the following Measurement Computing Incremental Encoder drivers. Please use the new version of these drivers.

- CIO-QUAD02
- CIO-QUAD04
- PCI-QUAD04

To access the previous versions of these drivers, use the `xpcobsoletelib` command. The presence of the obsoleted versions of these drivers is not guaranteed for future releases.

## **Upgrading from an Earlier Release**

This section describes the upgrade issues involved in moving to xPC Target 2.5 from Version 2.0.

### **Recreate Target Boot Disk and Rebuild Applications**

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



## Known Limitations

This section describes known limitations with xPC Target.

### Model Reference and xPC Target Parameters

If you download a target application to a target PC, and that target application was built from a model that contains referenced models, you cannot tune the parameters on any of the models.

### xPC Target Explorer Workaround

If xPC Target Explorer becomes inoperable, perform the following. This procedure deletes any existing xPC Target Explorer configurations and requires that you reconfigure xPC Target Explorer.

- 1 Close the xPC Target Explorer window.
- 2 In the MATLAB Command Window, type  

```
prefdir
```

The pathname to MATLAB preferences is displayed.
- 3 Using either the MATLAB Command Window or a Windows Explorer window, change directory to that pathname.
- 4 Look for and remove the `xpcmngrpref.mat` file in the `xPCTargetPrefs` directory.
- 5 In the MATLAB Command Window, restart xPC Target Explorer. Type  

```
xpcexplr
```
- 6 Reconfigure the xPC Target Explorer settings.

### Multiport Blocks

If your model has multiport blocks, on rare occasions, xPC Target might generate an incorrect port suffix for the multiport blocks. For example, if you have a block, `myblock`, with two ports, the generated code for the block might have as its signal names `myblock/p3` and `myblock/p4`, instead of the expected `myblock/p1` and `myblock/p2`.

If you see this behavior, use the incorrectly generated signal names to retrieve the signal ID. Everything else should work as expected.

### **Obsolete Device Drivers and BVM PMCDIO64**

The xPC Target I/O Reference Guide documentation and `xpcobsoletelib` command indicate that the BVM PMCDIO64 drivers have been obsoleted. This is incorrect. These BVM drivers are still fully supported. The BVM driver sublibrary will be reestablished in a later release. You can still access these drivers from the aforementioned library location (`xpcobsoletelib`).

### **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).

### **Watcom C/C++ Version 10.6**

The following are limitations with the Watcom C/C++ Version 10.6

- If you use interrupts in your target application, or if you use the IRQ Source block from the Asynchronous Event sublibrary, do not use the Watcom C/C++ Version 10.6 compiler. You will get an error. Use another supported compiler, such as Watcom C/C++ Version 11.0.
- If your model contains PC 104 CAN blocks, you cannot compile the target application with Watcom C/C++ Version 10.6. Use another supported compiler, such as Watcom C/C++ Version 11.0.

## Major Bug Fixes

xPC Target 2.5 includes several bug fixes made since the library update Version 2.0.2. This section describes the particularly important Version 2.5 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**

This section includes a link to a description of known software and documentation problems in xPC Target 2.5.

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.

# xPC Target 2.0 Release Notes

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## New Features

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

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**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.

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**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.

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If you are upgrading from a release earlier than Release 12.1, then you should also see “New Features” on page 7-2.

### 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.html> 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

`xpcrcetool` (**Remote Control 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 as 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.html> 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 7-4.



# xPC Target 1.2 Release Notes

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## 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 8-3.

### C API

A beta version of the xPC Target C API is available from the Product News page at <http://www.mathworks.com/support/product/XP/productnews/productnews.html>.

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/product/XP/productnews/productnews.html> 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/product/XP/productnews/productnews.html> 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 field bus 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 `xpc test`, select a current directory outside of the MATLAB 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.



# xPC Target 1.1 Release Notes

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## 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.

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**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.

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### 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 then 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

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