

# **Data Acquisition Toolbox Release Notes**

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## Summary by Version

This table provides quick access to what's new in each version. For clarification, see "About Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
<b>Latest Version V2.9 (R2006b)</b>	Yes Details	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF  Current product documentation
V2.8.1 (R2006a)	No	No	Bug Reports Includes fixes	No
V2.8 (R14SP3+)	Yes Details	No	Bug Reports Includes fixes	No
V2.7 (R14SP3)	No	No	Bug Reports Includes fixes	No
V2.6 (R14SP2)	Yes Details	No	Bug Reports Includes fixes	No
V2.5.1 (R14SP1)	No	No	Fixed bugs	No
V2.5 (R14)	No	No	Fixed bugs	No

### About Release Notes

Use release notes when upgrading to a newer version to learn about new features and changes, and the potential impact on your existing files and practices. Release notes are also beneficial if you use or support multiple versions.

If you are not upgrading from the most recent previous version, review release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the New Features and Changes, Version Compatibility Considerations, and Bug Reports for V1.1 and V1.2.

## **New Features and Changes**

These include

- New functionality
- Changes to existing functionality
- Changes to system requirements (complete system requirements for the current version are at the MathWorks Web site)
- Any version compatibility considerations associated with each new feature or change

## **Version Compatibility Considerations**

When a new feature or change introduces a known incompatibility between versions, its description includes a **Compatibility Considerations** subsection that details the impact. For a list of all new features and changes that have compatibility impact, see the “Compatibility Summary for Data Acquisition Toolbox” on page 23.

Compatibility issues that become known after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

## **Fixed Bugs and Known Problems**

MathWorks Bug Reports is a user-searchable database of known problems, workarounds, and fixes. The MathWorks updates the Bug Reports database as new problems and resolutions become known, so check it as needed for the latest information.

Access Bug Reports at the MathWorks Web site using your MathWorks Account. If you are not logged in to your MathWorks Account when you link to Bug Reports, you are prompted to log in or create an account. You then can view bug fixes and known problems for R14SP2 and more recent releases.

The Bug Reports database was introduced for R14SP2 and does not include information for prior releases. You can access a list of bug fixes made in prior versions via the links in the summary table.

## **Related Documentation at Web Site**

**Printable Release Notes (PDF).** You can print release notes from the PDF version, located at the MathWorks Web site. The PDF version does not support links to other documents or to the Web site, such as to Bug Reports. Use the browser-based version of release notes for access to all information.

**Product Documentation.** At the MathWorks Web site, you can access complete product documentation for the current version and some previous versions, as noted in the summary table.

## Version 2.9 (R2006b) Data Acquisition Toolbox

This table summarizes what's new in Version 2.9 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF  Current product documentation

New features and changes introduced in this version are

- Data Acquisition Toolbox Block Library
- New Hardware Support

### Data Acquisition Toolbox Block Library

You can use these blocks to acquire analog or digital data in a Simulink® model, or to output analog or digital data from the model to a hardware device. The toolbox block library contains four blocks:

- **Analog Input** — Acquire data from multiple channels of an analog data acquisition device.
- **Analog Output** — Output data to multiple channels of an analog data acquisition device.
- **Digital Input** — Acquire latest set of values from multiple lines of a digital data acquisition device.
- **Digital Output** — Output data to multiple lines of a digital data acquisition device.

### New Hardware Support

Additional data acquisition hardware support was added, as follows:



- **Support added for four additional National Instruments (NI) data acquisition devices** — NI USB-6251 (USB); NI USB-6259 (USB); NI PCIe-6251 (PCI Express); and NI PCIe-6259 (PCI Express).
- **Support added for an additional Measurement Computing Corporation (MCC) data acquisition device** — MCC USB-1408FS (USB).

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**Note** For the latest information about supported hardware, visit the Data Acquisition Toolbox product page at the MathWorks Web site [www.mathworks.com/products/daq](http://www.mathworks.com/products/daq).

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## Version 2.8.1 (R2006a) Data Acquisition Toolbox

This table summarizes what's new in Version 2.8.1 (R2006a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
No	No	Bug Reports Includes fixes	No

## Version 2.8 (R14SP3+) Data Acquisition Toolbox

This table summarizes what's new in Version 2.8 (R14SP3+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	No

New features and changes introduced in this version are

- “NI-DAQmx Support” on page 7
- “Upgrading from an Earlier Release” on page 8
- “Vendor Limitations” on page 8

### NI-DAQmx Support

The Data Acquisition Toolbox supports National Instruments hardware that uses the NI-DAQmx software interface.

The adaptor name in the Data Acquisition Toolbox is `nidaq`, which can be used in all syntax requiring the adaptor name.

To display your installed hardware that can be accessed using the NI-DAQmx adaptor, type

```
daqhwinfo('nidaq')
```

`daqhwinfo` returns information about the hardware that is installed, and the IDs that the National Instruments Measurement & Automation Explorer has assigned to these devices. Typically, these IDs start with the letters `Dev` followed by a number.

The toolbox supports both Traditional NI-DAQ and NI-DAQmx. For information about choosing which driver to use, see “National Instruments Hardware” in “Troubleshooting Your Hardware” of the Data Acquisition Toolbox Users’ Guide.

## Upgrading from an Earlier Release

This section details the issues to be aware of when upgrading from the Data Acquisition Toolbox 2.7 to Version 2.8.

### DriveAISenseToGround Property

The DriveAISenseToGround property is ignored by National Instruments devices. For information on configuring AI referencing properties, see the reference page for the InputType property.

## Vendor Limitations

This section describes specific limitations of the Data Acquisition Toolbox particular to each vendor:

- “Keithley Hardware” on page 8
- “National Instruments Hardware” on page 11
- “Measurement Computing Hardware” on page 12
- “Agilent Technologies Hardware” on page 12
- “Windows Sound Cards” on page 13

### Keithley Hardware

Known problems associated with Keithley hardware are described below. If there is a known resolution, then it is described as well.

Problem	Boards	Comments
Data missed event on output	KCPI-1801/02 KPCI-3110	For high sample rates and large numbers of samples, these boards may drop samples on output. To avoid this problem, try increasing the default BufferingConfig property value.

<b>Problem</b>	<b>Boards</b>	<b>Comments</b>
No output at maximum sampling rate	KPCI-3110	When the sampling rate is set above 600 kHz, the output is corrupted.
Cannot sample properly below 10 Hz	KPCI-3110	For sample rates at or below approximately 10 Hz, the acquisition takes longer than expected. For example, a 1-second acquisition at 10 Hz takes approximately 3 seconds.  This is due to a limitation in the number of blocks that the hardware device can transfer at a time. To avoid this problem, use software clocking.
Time out on output	Software clocked devices	Some software clocked devices may time out when outputting data. This is due to a limitation in the number of blocks that the hardware devices can transfer at a time.
Queuing data while running	KPCI-1801/02HC KPCI-3110	If an analog output object is running and more data is queued, then no data is output. To avoid this problem, try increasing the default BufferingConfig property value.

<b>Problem</b>	<b>Boards</b>	<b>Comments</b>
Digital triggers are not available.	All	Digital triggers are not available if supported in interrupt mode. This applies to both start and stop triggers. Digital triggers are available only if supported in direct memory access (DMA) mode.
Limited channel skew values	PCMCIA boards	These boards support only these specific channel skew values: 10 $\mu$ s, 20 $\mu$ s, 40 $\mu$ s.
SS/H is not supported for analog output.	PCMCIA boards, DDA-08, DDA-16	The analog output subsystems for these boards have simultaneous sample and hold (SS/H) capabilities. However, the toolbox does not support this feature.
Repeating triggers may result in dropped samples.	All	If the TriggerRepeat property is nonzero, samples may be dropped during acquisition. To avoid this problem, configure the BufferingConfig property to an exact multiple of the SamplesPerTrigger property.
Analog input subsystem is not available.	KPCMCIA-16AIAO	N/A

## National Instruments Hardware

- The Data Acquisition Toolbox requires Version 7.5 of the NI-DAQmx drivers.
- If you use the Data Acquisition Toolbox and National Instruments' Measurement and Automation (M&A) Explorer at the same time, a conflict will occur and you will not be able to access your board. To avoid a conflict, you should access your board using either the toolbox or the M&A Explorer, and close the other software application.
- If you install NI-DAQ on your computer, and then install LabVIEW 6i on the same computer, you will need to reinstall NI-DAQ.
- When running a device with a Traditional NI-DAQ driver at a sampling rate of 5000 Hz or higher and with a TransferMode property value of Interrupt, system performance might decline.
- You should configure the SampleRate property with the setverify function just before starting the hardware. Note that the SampleRate value depends on the number of channels added to the device object, and the ChannelSkew property value depends on the SampleRate value.
- When using the 1200 series hardware, you must add channels in reverse order. If you specify invalid channels, the data acquisition engine will create the number of requested channels with valid hardware IDs. You can determine the hardware IDs with the object's display or with the HwChannel property.
- Only one digital I/O (DIO) object should be associated with a given DIO subsystem. To perform separate tasks with the hardware lines, you should add all the necessary lines to the DIO object, but partition them into separate line groups based on the task.
- When using a Traditional NI-DAQ driver, all channels contained within an analog input object must have the same polarity. In other words, the InputRange property for these channels must have all unipolar values or all bipolar values.
- When using mux boards, you must add channels in a specific order using the addmuxchannel function.

- If you have trouble acquiring data with the DAQPad-MIO-16XE-50, you should increase the size of the engine buffer with the `BufferingConfig` property.

## Measurement Computing Hardware

- For boards that do not have a channel gain list, an error occurs at start if all the channel input ranges are not the same or the channel scan order is not contiguous. However, if the `ClockSource` property value is set to software, this rule does not apply.
- You should configure the `SampleRate` property with the `setverify` function just before starting the hardware. Note that the `SampleRate` value is dependent upon the number of channels added to the device object.
- For boards that do not support continuous background transfer mode (i.e., the board does not have hardware clocking), the only available `ClockSource` property value is software.
- When running at a sampling rate of 5000 Hz or higher and with a `TransferMode` property value of `InterruptPerPoint`, there may be a considerable decline in system performance.
- Most boards do not support simultaneous input and output. However, if software clocking is used, then this limitation does not apply.
- To use hardware digital triggers with the PCI-DAS4020/12 board, you must first configure the appropriate trigger mode with `InstaCal`.
- Expansion boards are not supported. This includes the CIO-EXP family of products.
- MEGA-FIFO hardware is not supported.

## Agilent Technologies Hardware

- When you start an analog input object associated with an E1432A or E1433A board that has the Arbitrary Source Output option, the source is automatically started. Therefore, you should not use a `TriggerType` property value of `Manual` with hardware having this option.
- For analog output objects, you should configure the `SampleRate` and `Span` properties with the `setverify` function just before starting the hardware,



since these property values depend on the number of channels contained by the analog output object.

- You must add channels in increasing order and a channel array cannot contain repeated channels.
- The first time you connect a device object to an Agilent board, a list of available hardware is determined and all the hardware is initialized. However, this list is not updated during a MATLAB session. Therefore, if you install a new board or remove an existing board while MATLAB is running, you will not see the new configuration. To see the new configuration, you must restart MATLAB. When all device objects are deleted from the data acquisition engine, all the hardware is closed.
- For the E1433A, the minimum sampling rate is 20 Hz and the minimum span is 7.8125.
- The first channel in the `TriggerChannel` property list is used to trigger the object.
- For the E1434A, channels 1 and 2 and channels 3 and 4 share a 56000 DSP. Therefore, certain operational aspects are coupled between the channels in each pair. For example, both channels in each pair will have the same `RampRate` property value.
- If you create a device object that spans multiple boards, the device object should list the logical addresses using the same order as returned by the `daqhwinfo` function. To determine the logical address order, use the `daqhwinfo` function with no input arguments and examine the `InstalledBoardIds` field.

## Windows Sound Cards

- The maximum sampling rate depends on the `StandardSampleRates` property value. If `StandardSampleRates` is `On`, the maximum `SampleRate` property value is 44100. If `StandardSampleRates` is `Off`, the maximum `SampleRate` property value is 96000 if supported by the sound card.

For some sound cards that allow nonstandard sampling rates, certain values above 67,000 Hz will cause your computer to hang.

- If you are acquiring data when `StandardSampleRates` is `Off`, one of these messages may be returned to the command line depending on the specific sound card you are using:
  - "Invalid format for device winsound" occurs when the sound card does not allow for any nonstandard value.
  - "Device Winsound already in use" occurs when a nonstandard sampling rate is specified and the device takes longer than expected to acquire data.

## Version 2.7 (R14SP3) Data Acquisition Toolbox

This table summarizes what's new in Version 2.7 (R14SP3):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
No	No	Bug Reports Includes fixes	No

## Version 2.6 (R14SP2) Data Acquisition Toolbox

This table summarizes what's new in Version 2.6 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	No

New features and changes introduced in this version are

- “New Functions: islogging, isrunning, and issending” on page 16
- “Using PFI or RTSI Channels for Triggers and Clocks” on page 17
- “peekdata Allows Type Parameter” on page 17
- “Property Inspector Replaces daqpropedit” on page 17
- “waittilstop Function Renamed wait” on page 18
- “Upgrading from an Earlier Release” on page 18

### New Functions: islogging, isrunning, and issending

Three new functions are provided to query the status of data acquisition device objects:

Function	Purpose
islogging	Determine whether analog input object is logging data.
isrunning	Determine whether device object is running.
issending	Determine whether analog output object is sending data.

For further details on each function, see its reference page in the documentation. Use of these functions is recommended over directly accessing the Running, Logging, and Sending properties.

## Using PFI or RTSI Channels for Triggers and Clocks

Three new properties for National Instruments cards are

- `HwDigitalTriggerSource`
- `ExternalSampleClockSource`
- `ExternalScanClockSource`

These properties allow you to select a PFI or RTSI channel as the source for a hardware digital trigger, external sample clock, or external scan clock. See the reference pages for these properties to read about valid property settings and when they are in effect.

## peekdata Allows Type Parameter

The `peekdata` function now accepts a third parameter specifying data format. When the data format is specified as `native`, data is returned in the native format of the data acquisition device, similar to the behavior of the `getdata` function. For detailed information on `peekdata`, type

```
help analoginput/peekdata
```

## Property Inspector Replaces daqpropedit

The Property Inspector replaces the Data Acquisition Property Editor (`daqpropedit`) graphical user interface.

You open the Property Inspector for object `obj` with the `inspect` function.

```
inspect(obj)
```

For more information about the `inspect` function, type

```
help daqdevice/inspect
```

Typing `daqpropedit` at the command line now opens the Property Inspector.

## waittilstop Function Renamed wait

The waittilstop function has been renamed wait. All functionality remains the same. waittilstop still works in Version 2.6, but may be removed from a future version of the toolbox. For more information on wait, type

```
help daqdevice/wait
```

## Upgrading from an Earlier Release

This section describes the issues involved in upgrading from the Data Acquisition Toolbox 2.5.1 (Release 14SP1), 2.5 (Release 14), or 2.2 (Release 13SP1).

### Obsolete Action Properties

All object properties with Action in their name are obsolete in Version 2.6. These have been replaced by properties with the same name using Fcn instead of Action. These Fcn properties have existed in several recent versions of the Data Acquisition Toolbox. The toolbox supported the Action properties during these transition releases, but they are no longer supported. If your code still uses these obsolete property names, you must update it to use the new property names.

Obsolete Property Name	New Property Name
DataMissedAction	DataMissedFcn
InputOverRangeAction	InputOverRangeFcn
RuntimeErrorAction	RuntimeErrorFcn
SamplesAcquiredAction	SamplesAcquiredFcn
SamplesAcquiredActionCount	SamplesAcquiredFcnCount
SamplesOutputAction	SamplesOutputFcn
SamplesOutputActionCount	SamplesOutputFcnCount
StartAction	StartFcn
StopAction	StopFcn
TimerAction	TimerFcn
TriggerAction	TriggerFcn

## Deleting a Running Object

In past releases, you could not delete a running object. Now in Version 2.6, when you attempt to delete a running object, the toolbox stops the object, issues a warning, then deletes the object.

```
ai.SamplesPerTrigger = Inf
start(ai);
delete(ai)
Warning: Object stopped before deleting.
```

## Return Format of daqfind

In past versions, the `daqfind` function returned a 1-by-1 cell array of N-by-1 objects. Now in Version 2.6, this function returns an N-by-1 cell array of objects.

```
ai1 = analoginput('winsound');
ai2 = analoginput('winsound');
objs = daqfind('Type','Analog Input')
objs =
    [1x1 analoginput]
    [1x1 analoginput]
```

## peekdata and getdata Number of Samples

The functions `peekdata` and `getdata` no longer accept `Inf` as an argument for specifying the number of samples. In the past, specifying `Inf` for the number of samples was accepted, and returned zero samples. Now specifying `Inf` samples causes an error.

```
data = getdata(ai, Inf)
??? The number of samples requested must be less than Inf.
```

## waittilstop Function Renamed wait

The `waittilstop` function has been renamed `wait`. All functionality remains the same. `waittilstop` still works in Version 2.6, but may be removed from a future version of the toolbox. For more information on `wait`, type

```
help daqdevice/wait
```

### **daqpropedit Replaced by inspect**

The Data Acquisition Property Editor (`daqpropedit`) graphical user interface has been replaced by the Property Inspector.

You open the Property Inspector for object `obj` with the `inspect` function.

```
inspect(obj)
```

For more information about the `inspect` function, type

```
help daqdevice/inspect
```

Typing `daqpropedit` at the command line now opens the Property Inspector.



## Version 2.5.1 (R14SP1) Data Acquisition Toolbox

This table summarizes what's new in Version 2.5.1 (R14SP1):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
No	No	Fixed bugs	No

## Version 2.5 (R14) Data Acquisition Toolbox

This table summarizes what's new in Version 2.5 (R14):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
No	No	Fixed bugs	No

## **Compatibility Summary for Data Acquisition Toolbox**

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
<p><b>Latest Version</b> <b>V2.9 (R2006b)</b></p>	<p>Analog Input objects have a number of input types: <code>NonReferencedSingleEnded</code>, <code>SingleEnded</code>, <code>Differential</code>, and <code>Pseudodifferential</code>. In the initial release of the NIDAQmx adapter with R14SP3+, Version 2.8, <code>Pseudodifferential</code> was incorrectly spelled as <code>Psuedodifferential</code>. The change is to correctly spell this input type as <code>Pseudodifferential</code>.</p> <p>This change is backward compatible; users that saved Analog Input objects with the <code>InputType</code> set to the misspelled <code>Psuedodifferential</code> will be able to load the object in R2006b and later with no changes on their part. The compatibility issue is that if you save an Analog Input object with this input type in R2006b, you will not be able to share it with users of R2006a and previous versions. Analog Input objects that have their <code>InputType</code> set to <code>Pseudodifferential</code> will be unusable in R2006a and previous releases. Analog Input objects that use the other input types are unaffected.</p> <p><b>Obsolescence Process:</b></p> <p>If you use the <code>set</code> function to assign the incorrectly spelled value <code>Psuedodifferential</code>, in R2006b you will get a warning and it will be changed to the correct spelling. In the following release of the toolbox, you will get an error advising you to use the new spelling. The <code>get</code> function will always return the correctly spelled value.</p>
V2.8.1 (R2006a)	None
V2.8 (R14SP3+)	None

<b>Version (Release)</b>	<b>New Features and Changes with Version Compatibility Impact</b>
V2.7 (R14SP3)	None
V2.6 (R14SP2)	None
V2.5.1 (R14SP1)	None
V2.5 (R14)	None