

Product Releases for dSPACE Release 3.4

New Features and Migration

Release 3.4 – October 2002



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Software Updates and Patches

dSPACE strongly recommends that you download and install the most recent patches for your current dSPACE installation. Visit <http://www.dspace.de/en/Support/Support.htm> for software updates and patches.

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About This Document

This document provides you with a brief overview of the major new features on the Product Release for dSPACE Release 3.4.

About dSPACE Releases

For information on how dSPACE software products are released. Refer to *About dSPACE Releases* on page 7.

New features and enhancements

For a description of the key features, and a summary of the major enhancements made since dSPACE Release 3.3. Refer to *Key Features of dSPACE Release 3.4* on page 9

Migration

In addition, this document provides you with information on the changes you may have to perform when you migrate from previous releases to dSPACE Release 3.4. Refer to:

- *Migrating to dSPACE Release 3.4* on page 21
- *How to Migrate from dSPACE Release 3.2 or Earlier* on page 22

New products

For a description of the new products for dSPACE Release 3.4. Refer to *Key Features of Product Releases for dSPACE Release 3.4* on page 25

Legend

The following symbols are used in this document.



Warnings provide indispensable information to avoid severe damage to your system and/or your work.



Notes provide important information that should be kept in mind.



Tips show alternative and/or easier work methods.



Examples illustrate work methods and basic concepts, or provide ready-to-use templates.

About dSPACE Releases

All dSPACE products that form a seamlessly integrated tool chain and work with a definite set of third-party products are included in a dSPACE Release:

Dependencies on third-party products

- A dSPACE Release identifies a unique set of dSPACE product versions. This means that one dSPACE Release does not contain two versions of the same dSPACE product.
- One CD may contain multiple dSPACE Releases, each of which has a separate installation script.
- A compatibility matrix given in the `CompList.txt` file (see root directory of the dSPACE CD) describes the dependencies of a dSPACE Release on the products of other vendors (MATLAB, compilers, Windows XX, etc.).
- It is possible for one dSPACE Release to support different MATLAB releases.

Release numbering

- A dSPACE Release number consists of two digits to identify major and minor releases (**major.minor**, for example, dSPACE Release 3.3).

- For patches, a patch number is appended to the dSPACE Release number (**major.minor patch**, for example, dSPACE Release 3.3p1).

Key Features of dSPACE Release 3.4

dSPACE Release 3.4 comes with the following key features:

- The software of dSPACE Release 3.4 offers full compatibility with **MATLAB R12.1** without updates and **MATLAB R12.1** with **Simulink 4.1.1** and **Real-Time Workshop 4.1.1**. It does not support MATLAB R12 or earlier.
- The software of dSPACE Release 3.4 supports Windows 98, Windows Me, Windows NT 4.0 or Windows 2000. It does not support Windows XP.
- dSPACE Release 3.4 includes the new software tool **MotionDesk**. This new tool generation visualizes real-time simulations on your dSPACE system as 3-D online animations. For details, refer to *MotionDesk* on page 18.
- DS1005 provides flight recording to the flash memory and access functions to store/restore data to/from the flash memory.

**Implementation:
key feature summary**

- MicroAutoBox provides multichannel PWM (drives control), extended flash memory access and software controlled power supply.
- The CAN bus provides extended run-time performance. In addition, it supports raw data access to perform custom encoding.
- The DS4302's CAN bus can now handle an unlimited number of messages.

For details, refer to:

- *New Installation and Configuration Features* on page 11, which provides information on the new installation features of dSPACE Release 3.4.
- *New Implementation Features* on page 12, which lists the most important new features, enhancements and changes in the implementation software since dSPACE Release 3.3.
- *New Experiment Features* on page 17, which lists the most important new features, enhancements and changes in the experiment and test software since dSPACE Release 3.3.
- *New Documentation Features* on page 19, which provides information on the enhancements and changes in the documentation.

New Installation and Configuration Features

dSPACE Release 3.4 comes with a new licensing mechanism that is especially suitable for large development teams. The various dSPACE software modules are license-protected. Up to dSPACE Release 3.3, only single-user licenses were available.

Floating network licenses

For dSPACE Release 3.4, you can also purchase *floating network licenses* that can be used on networked PCs on which the dSPACE software is installed (*dSPACE License Clients*). Using the floating network licenses, only the number of software modules that can run at the same time is limited. The software itself can be installed on more computers. The clients are connected to a PC that manages the corresponding dSPACE licenses (*dSPACE License Server*).

For further information on the requirements and the handling of floating network licenses, see *Using Floating Network Licenses* in your *Installation and Configuration Guide*.

New Implementation Features

dSPACE Release 3.4 comes with several new implementation features, enhancements and changes that apply to all dSPACE boards, see below.

Compatibility with MATLAB R12.1

RTI and RTI-MP on Release 3.4 offer full compatibility with MATLAB R12.1 with Simulink 4.1.1 and Real-Time Workshop 4.1.1.

In addition, there are changes that apply to specific dSPACE boards:

- *New Implementation Features for DS1103* on page 13
- *New Implementation Features for DS1104* on page 13
- *New Implementation Features for MicroAutoBox* on page 14
- *New Implementation Features for Modular Hardware* on page 14
- *New Implementation Features for the RTI CAN Blockset* on page 16

General Implementation Features, Enhancements and Changes

RTLib, RTI and RTI-MP of dSPACE Release 3.4 provide the following hardware-independent new features and enhancements. Unless stated otherwise, these features can be implemented on all dSPACE systems.

Buffered Task Transition

The Buffered Task Transition blocks now can handle all Simulink data types, with the exception of the complex data types. Refer to *Buffered Task Transition (Read) Block* or *Buffered Task Transition (Write) Block* in the *RTI and RTI-MP Implementation Reference*.

Updating the TRC and SDF files

If the user trace file or the user description file of a model have been changed, the trace file and the system description file of the model can now be updated via MATLAB commands. Refer to *How to Update Trace and System Description Files* in the *RTI and RTI-MP Implementation Guide*.

Excluding subsystems from TRC file The new TRC Exclusion block lets you reduce the size of the generated variable description file (TRC file). This results in a faster generation process and faster loading in ControlDesk, if you exclude large parts of your model. The block also allows you to hide model parts that are not to be seen by other users. Refer to *Excluding Subsystems from the TRC File* in the *RTI and RTI-MP Implementation Guide*.

Launch Pad integration Several dSPACE products are now integrated into the MATLAB Launch Pad.

Improved documentation Descriptions of programming S-functions and tuning parameters of transfer functions, zero-pole and state-space blocks have been improved or added. Refer to *Implementing S-Functions* or *Tuning Parameters of Transfer Fcn, Zero-Pole and State-Space Blocks* in the *RTI and RTI-MP Implementation Guide*.

New Implementation Features for DS1103

dSPACE Release 3.4 provides the following new implementation features and enhancements for the DS1103:

PWM3 and PWMSV signal generation The synchronization interrupt for PWM3 and PWMSV signal generation can be specified at any position within a PWM period. This feature is not supported by RTI. Refer to *ds1103_slave_dsp_pwm3_init* and *ds1103_slave_dsp_pwm3sv_init* in the *DS1103 RTLib Reference*.

New Implementation Features for DS1104

dSPACE Release 3.4 provides the following new implementation features and enhancements for the DS1104:

Synchronizing I/O features RTI now provides a setup block for synchronizing the I/O features of the board by an external trigger. Refer to *DS1104SYNC_IO_SETUP* in the *DS1104 RTI Reference*.

PWM3 and PWMSV signal generation The synchronization interrupt for PWM3 and PWMSV signal generation can be specified at any position within a PWM period. This feature is not supported by RTI. Refer to *ds1104_slave_dsp_pwm3_init* and *ds1104_slave_dsp_pwm3sv_init* in the *DS1104 RTLib Reference*.

New Implementation Features for MicroAutoBox

dSPACE Release 3.4 provides the following new implementation features and enhancements for MicroAutoBox:

Multi-channel PWM	MicroAutoBox provides 3-channel edge aligned and 3- and 6-channel center aligned multi-channel PWM generation. To pick up engine data, an interface function for an incremental encoder is integrated. Refer to <i>Drives Control (DC)</i> in the <i>DS1401 Feature Reference</i> .
Power hold on/ off	MicroAutoBox provides a software controlled power supply. This allows the termination of all processes to prevent data loss when MicroAutoBox is shut down. Refer to <i>Power Hold On/Off</i> in the <i>DS1401 Feature Reference</i> .
Several camshaft sensor signals	Extended Engine Control provides the use of rapid-start sensor rotors. Several camshaft sensor signals within one engine cycle shorten the synchronization time between camshaft and crankshaft. Refer to <i>Extended Engine Control (EEC)</i> in the <i>DS1401 Feature Reference</i> .
Flash memory access	MicroAutoBox provides flash memory access to store/restore data to/from the flash memory from the Simulink model. Refer to <i>Flash Memory Access</i> in the <i>DS1401 Feature Reference</i> .

New Implementation Features for Modular Hardware

dSPACE Release 3.4 provides the following new implementation features and enhancements for modular hardware:

Flight recorder	DS1005 provides flight recording of up to 15.5 MByte data to the flash memory. Up to 250 real-time variables can be recorded. Refer to <i>Flight Recorder</i> in the <i>DS1005 Feature Reference</i> .
Flash memory access	DS1005 provides flash memory access to store/restore data to/from the flash memory. Refer to <i>Flash Memory Access</i> in the <i>DS1005 Feature Reference</i> .

- New features for DS2210**
- A new block is added to the angular processing unit (APU). The block converts absolute angle positions of the APU to angle positions related to the TDC or user-defined positions. Refer to *Engine Position Phase Accumulator* in the *DS2210 Feature Reference*.
 - RTLib allows the use of the continuous and event-window based data capture mode at the same time. Refer to *Angular Processing Unit (APU)* in the *DS2210 RTLib Reference*.
- New features for DS4002**
- RTI now provides a block for reading the states and time stamps of captured events. Refer to *DS4002READ_EVENT_Bx_Cy* in the *DS4002 RTI Reference*.
 - Additionally, this block can generate read event interrupts, which can be enabled by using the improved *DS4002_HWINT_Bx_Iy* block. Refer to *DS4002_HWINT_Bx_Iy* in the *DS4002 RTI Reference*.
- New features for DS4302**
- New features for the DS4302 are provided by the RTI CAN blockset. Refer to *New Implementation Features for the RTI CAN Blockset* on page 16.
- New features for DS5001**
- The read block for the DS5001 now returns the number of actually detected edges in addition to the states and time stamps. Refer to *DS5001READ_Bx_Cy* in the *DS5001 RTI Reference*.
 - Additionally, this block can generate read event interrupts, which can be made available by the improved *DS5001_HWINT_Bx_Iy* block. Refer to *DS5001_HWINT_Bx_Iy* in the *DS5001 RTI Reference*.
- New features for DS5101**
- The PWM signal generation (*DS5101PWM3_Bx_BLy* and *DS5101PWM6_Bx_BLy*) now provides an input port for specifying an interrupt shift signal to change the interrupt position. The interrupts of these blocks can be made available by the improved *DS5101_HWINT_Bx_Iy* block. Refer to *DS5101PWM3_Bx_BLy*, *DS5101PWM6_Bx_BLy*, or *DS5101_HWINT_Bx_Iy* in the *DS5101 RTI Reference*.

New Implementation Features for the RTI CAN Blockset

dSPACE Release 3.4 provides the following new implementation features and enhancements for the RTI CAN blockset:

Raw data manipulation	RTICAN provides an API to edit CAN messages, for example, to write the value of a checksum to the last message byte. Refer to <i>Raw Data Manipulation</i> in the <i>Feature Reference</i> of your dSPACE board.
Data type support	The data type for RX, RM and TX blocks can be selected. Refer to <i>RTICAN CONTROLLER SETUP</i> in the <i>RTI CAN Blockset Reference</i> .
Delayed message transmission	For TX blocks, delay times for sending messages can be defined and used, for example to avoid message bursts. Refer to <i>Defining Messages</i> in the <i>Feature Reference</i> of your dSPACE board.
New concept for receive message	Only for DS4302: The RX Service Support uses a new concept for receive messages that allows the use of an unlimited number of RX blocks. Refer to <i>RX Service Support</i> in the <i>DS4302 Feature Reference</i> .
Extended support of C252 transceiver	Only for DS4302: RTI now supports the on-chip error management of a fault-tolerant C252 transceiver. This allows the CAN bus to work when errors occur. For details, refer to <i>Physical Layer/CAN Transceiver</i> in the <i>DS4302 Feature Reference</i> .
Loop-back functionality	Only for DS4302: The data sent by a TX block can be received on the same CAN controller.

New Experiment Features

ControlDesk on dSPACE Release 3.4 comes with new features and enhancements, see below.

MotionDesk is the new tool generation for visualizing real-time simulations on your dSPACE system as 3-D online animations. For details, refer to *MotionDesk* on page 18.

ControlDesk

ControlDesk on dSPACE Release 3.4 comes with the following new features and enhancements:

Value conversion for several instruments

On common electronic control units (ECUs), floating-point calculation is not available (unlike with PCs or workstations). This means that every physical quantity that would be represented by a floating-point number on a PC or a workstation has to be represented by an integer on the ECU. The floating-point numbers used on a PC can be converted using the appropriate forward scaling function. The integer numbers used on an ECU can be converted using the corresponding backward scaling function. Refer to *Value Conversion* in the *ControlDesk Experiment Guide*.

Limit supervision for Slider and Knob instruments

When failures are simulated, limit supervision of values passed to a simulator platform can be disabled. The limits are either ignored or invalid values cause a warning. You can test the model's behavior around the limits. Refer to *Limit Supervision Page* in the *ControlDesk Instrument Reference*.

Improved firmware handling

For safety reasons, the boot firmware now undergoes CRC checks on every startup of the MicroAutoBox. Refer to *Handling Firmware* in the *ControlDesk Experiment Guide*.

CaptureData class

matlablib now provides the CaptureData class.

An instance of the CaptureData class can be used to load a MAT file generated by the ControlDesk capture functionality. You can access its data, change it or create a new MAT file. Refer to *CaptureData* in the *ControlDesk Test Automation Reference*.

“visible” attribute for MATLAB class

matlablib now provides a "visible" attribute for the MATLAB class. The attribute allows you to hide the MATLAB window or to make it visible. Refer to *Matlab* in the *ControlDesk Test Automation Reference*.

MotionDesk

MotionDesk is the new tool generation for visualizing real-time simulations on your dSPACE system as 3-D online animations. Compared to its predecessor, RealMotion, it provides much more realistic graphics thanks to textured rendering. Cameras and 3-D objects are configured interactively for fast visualization of ECU tests using hardware-in-the-loop simulation.

MotionDesk is used for 3-D animations, for instance in robotics and flight simulation, and in its main application: the automotive field. With a high-end hardware system, MotionDesk is the solution for “man-in-the-loop” applications, because these require a high frame rate and low latency times between simulation and visualization. MotionDesk’s graphical user interface is similar to other dSPACE tools. A virtual 3-D world is created by simply dragging and dropping objects from a 3-D library to a scene. The library contains the objects you need to create all the driving scenes you can think of: roads, houses, car bodies and wheels. Additional objects can easily be added as the 3-D object geometries are described in the VRML2 standard. Existing car geometries created with CAD systems are usable when converted to VRML2.

New blockset for MotionDesk

dSPACE Release 3.4 provides a new blockset to support visualizing real-time simulations with MotionDesk, named MotionDesk blockset. The MotionDesk blockset allows you to calculate the motion data and connect your simulation model to MotionDesk under Simulink. For details, refer to *Adapting Simulink Models* in the *MotionDesk 3-D Online Visualization Guide*.

New Documentation Features

The documentation that comes with dSPACE Release 3.4 has been enhanced:

Quick Reference for Automation and Test Automation

The Quick Reference presents every dSPACE-specific Python module in tabular form. Object information from the *ControlDesk Automation Reference* and *ControlDesk Test Automation Reference* is summarized in a set of compact tables. Each table provides a quick overview of the available objects, object dependencies, attributes and methods.

For hardcopy versions, use the PDF files available in HelpDesk's Print directory, see *CDAutoRefQuick.pdf* and *CDTestAutoRefQuick.pdf*.

In HelpDesk, the Quick Reference is extensively cross-referenced with the *ControlDesk Automation Reference* and *ControlDesk Test Automation Reference*.

RTLib references of I/O boards

The RTLib references of all I/O boards are integrated into dSPACE HelpDesk. You now have easy access to each RTLib function.

Migrating to dSPACE Release 3.4

After you install dSPACE Release 3.4, it may be necessary to carry out several steps. Note the following items when migrating from dSPACE Release 3.3 to dSPACE Release 3.4:

Migrating RTI

If you want to work with older models, you may have to carry out some migration steps. Refer to *Migrating to RTI 4.3* on page 23.

Migrating to MotionDesk

If you formerly worked with RealMotion and want to migrate to MotionDesk, refer to *Migrating from RealMotion to MotionDesk* on page 24.



If you migrate from dSPACE Release 3.2 or earlier, you have to carry out some additional steps to migrate to dSPACE Release 3.4, see below.

How to Migrate from dSPACE Release 3.2 or Earlier

If you migrate from dSPACE Release 3.2 or earlier, you have to carry out some additional steps to migrate to dSPACE Release 3.4. The table below shows the necessary steps for a few releases.

Former Release	Steps
dSPACE Release 3.2	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.3.
dSPACE Release 3.1	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE Release 3.2</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.2. 2. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.3.
dSPACE CD 3.0 with MATLAB R12	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE Release 3.2</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.2. As you have already used MATLAB R12 prior to migrating to Release 3.3, only the following sections are relevant: <ul style="list-style-type: none"> • <i>Migrating RTI for the DS2210</i> • <i>Migrating RTI for MicroAutoBox</i> • <i>Migrating RTI-MP</i> • <i>Migrating ControlDesk</i> 2. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.3.
dSPACE CD 3.0 with MATLAB R11	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE Release 3.2</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.2. 2. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration</i> of dSPACE Release 3.3.

Former Release	Steps
dSPACE CD 2.3.x	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE CD 3.0</i> in the <i>dSPACE Product CD New Features and Migration of dSPACE CD 3.0</i>. 2. See <i>Migrating to dSPACE Release 3.2</i> in the <i>dSPACE Release New Features and Migration of dSPACE Release 3.2</i>. 3. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration of dSPACE Release 3.3</i>.
dSPACE CD 2.2	<ol style="list-style-type: none"> 1. See <i>Migrating to dSPACE CD 2.3</i> in the <i>dSPACE Product CD New Features and Migration of dSPACE CD 2.3</i>. 2. See <i>Migrating to dSPACE CD 3.0</i> in the <i>dSPACE Product CD New Features and Migration of dSPACE CD 3.0</i>. 3. See <i>Migrating to dSPACE Release 3.2</i> in the <i>dSPACE Release New Features and Migration of dSPACE Release 3.2</i>. 4. See <i>Migrating to dSPACE Release 3.3</i> in the <i>dSPACE Release New Features and Migration of dSPACE Release 3.3</i>.



You can find the PDF files of the *New Features and Migration Guides* for previous releases on the dSPACE CD in the folder \Doc\Print or download them from <http://www.dspace.de/en/Info/download.HTM#Software>. The PDF files are named *NewFeaturesAndMigrationxx.pdf*, where *xx* stands for the version or release number.

Migrating to RTI 4.3

Migrating RTI1401

- The Flight Recorder now requires a FLASH_SETUP block. The block must be added to a model manually.
- The Engine Control blockset is no longer supported. You can use the new Extended Engine Control blockset instead.

Migrating from RealMotion to MotionDesk

RealMotion users who want to migrate to MotionDesk should note the following points:

3-D Real-Time Services

MotionDesk provides a Simulink blockset for the necessary transformation operations of model states into 3-D coordinates (MotionDesk blockset). However, since MotionDesk is fully compatible with the 3-D services that RealMotion uses, you are not forced to reimplement existing kinematic transformations with the 3-D MotionDesk blockset. It is not even necessary to recompile the real-time model.

Scenes

Since MotionDesk's graphical scenes are described in the VRML2 standard, scenes originally created for RealMotion (known as CTL files) cannot be used within MotionDesk. Automated conversion is not possible, so manual modifications are necessary in order to benefit from the immense graphical capabilities that MotionDesk provides. We therefore recommend recreating the desired scenes with Internet Scene Assembler (a 3rd-party tool shipped with MotionDesk) to produce VRML2 files.

Objects

MotionDesk's usual standard format for geometries of movable objects is VRML2. However, it is possible to reuse RealMotion geometry objects if they are available in the RealMotion MOV format. A MOV-to-VRML2 converter is delivered together with MotionDesk. Manual post-editing is necessary for shading methods other than flat shading and for textures.

For details, refer to *Migrating from RealMotion* in the *MotionDesk 3-D Online Visualization Guide*.

Key Features of Product Releases for dSPACE Release 3.4

Product Releases for dSPACE Release 3.4 are add-ons to Release 3.4. They come with the following new key features:

- The following improvements have been made to the **RTI CAN Blockset 2.1**:
 - Multiple data file support for changing the database during run time without recompiling the model.
 - New DBC file parser, which shortens the parsing time of the DBC file.
 - Extended performance (number of messages is not limited) with the RX service support.

For details, refer to *New Implementation Features for the RTI CAN Blockset* on page 26.

- The **RTI LIN Blockset 1.0** now supports the new DS4330 Interface Board, which connects the dSPACE Simulator to a local interconnect network (LIN) bus. For details, refer to *New RTI LIN Blockset* on page 27.
- The **RTI Bypass Blockset 1.0** consists of various RTI blocks for bypassing ECU control functions. For details, refer to *New RTI Bypass Blockset* on page 27.



The Product Releases for dSPACE Release 3.4 is only compatible with MATLAB Release 12.1.

New Implementation Features for the RTI CAN Blockset

The RTI CAN Blockset 2.1 provides the following new features.

Multiple data file support

The RTI CAN Blockset provides multiple data file support for the same CAN controller. This allows you to use various data files each defining a complete message configuration. Changing the data file during run time avoids long compiling times when using large HIL models. For details, refer to *Using Multiple Data Files*.

Multiple message support

The RTI CAN Blockset provides multiple message access for placing several receive or transmit blocks with the same identifier and identifier format in a model. For details, refer to *Using Multiple Data Files*.

New DBC file parser

DBC files are now parsed in one step. Parsing the DBC file only takes more time the first time a message is selected. Any further access to the messages is performed quickly. The old DBC file parser is replaced automatically by the RTI CAN Blockset. Old models can be used without changes. For details, refer to *Parsing Data Files*.

RX service support

The RX service support (now also for the DS1103, DS1401 and DS2210). provides better performance, and the number of messages is no longer limited. For details, refer to *RX Service Support*.

Redesigned message selection dialog

The message selection dialog supports flexible searching and sorting to quickly access to the searched message. For details, refer to *Message Selection Dialog* in the *RTI CAN Reference*.

Copying messages

Message configuration by copying signals is extended. Duplicated signals are now automatically numbered, allowing you to copy them without having to rename them. For details, refer to *RTICAN Transmit (TX)*.

New RTI LIN Blockset

The new RTI LIN Blockset now supports the DS4330 Interface Board. The DS4330 connects dSPACE Simulator to a local interconnect network (LIN) bus.

Characteristics

The DS4330 together with the RTI LIN Blockset has the following characteristics:

- 16 independent channels
- Each LIN bus can have up to 16 LIN slaves (according to the LIN specification)
- Baud rate up to 20 kBd (selectable via software)
- Support for database files in the DBC and LIN file format
- LIN slave termination. Although the DS4330 is designed for simulating LIN slaves and master, you can not simulate a LIN master because this is not supported by the RTI LIN Blockset 1.0.

For more information, refer to the *DS4330 Features* document.

New RTI Bypass Blockset

With service-based bypassing, you can develop new control features for an existing electronic control unit (ECU). To bypass existing functions in your ECU code, you need the ECU services and the RTI Bypass Blockset.

ECU services

An ECU service is a short code section that manages the communication between the dSPACE prototyped and the ECU. The ECU services must be implemented in your ECU code. Using them, the function in the ECU code will be bypassed. The function is executed on the dSPACE Prototyper and the calculated values are replaced by the ECU service. For details, refer to the *ECU Services Implementation Guide*.

RTI Bypass Blockset

The RTI Bypass Blockset consists of various RTI blocks for bypassing existing ECU control functions. The RTI blocks can be used to implement the communication between dSPACE Prototyper (DS1005 with a connected DS4120 or DS4121, or MicroAutoBox) and the ECU in Simulink models. The RTI Bypass Blockset also provides a sublibrary with setup and interrupt blocks for dSPACE Prototyper. For details, refer to the *RTI Bypass Blockset RTI Reference*.