
Version 9.0

VisSim/CAN User's Guide

By Altair Engineering, Inc.

Altair Engineering, Inc.
Altair Engineering User's Guides for VisSim Products - Version 9.0

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Contents

- Introduction** **1**
 - What is VisSim/CAN 1
 - The VisSim product family 1
 - Resources for learning VisSim/CAN 3
 - Interactive webinars..... 3
 - Sample diagrams 3
 - Training 4

- Installing VisSim/CAN** **5**
 - Installing USB CAN Peak device drivers..... 5
 - Installing VisSim/CAN 5

- Using VisSim/CAN** **7**
 - CAN PEAK Config command 7
 - CAN PEAK read block 8
 - CAN PEAK write block 10

- CAN Device Pinout** **13**
 - Schematic 13

- Redistributing VisSim models with CAN elements** **15**
 - How to distribute VisSim/CAN models with the Viewer..... 15
 - What the end user needs to view VisSim/CAN models 15

- Index** **17**

Introduction

This section contains...

What is VisSim/CAN

VisSim/CAN extends VisSim's functionality by providing a low-cost Controller Area Network (CAN) development platform. With VisSim/CAN, you can connect a PCAN USB-CAN device (purchased separately) to a VisSim block diagram using CAN read/write blocks.

You can easily log or plot data, or run a virtual plant or controller for model-based development. To read or write CAN data from VisSim simply plug in the USB-CAN device, wire CAN Read and/or CAN Write blocks into a diagram and then click the Go button.

You can transmit and receive from any number of different bus IDs in a single diagram. The CAN Read and CAN Write blocks let you read data from and write data to the CAN bus. Baud rate, data types and byte offset within the data packet can be quickly modified through the dialog boxes for these blocks. VisSim/CAN supports bus speeds of 1 MHz, 500 kHz, and 250 kHz.

The VisSim product family

The VisSim product family includes several base products and product suites, as well as a comprehensive set of targeted add-on modules that address specific problems in areas such as data communications, data acquisition, linearization and analysis, and digital signal processing.

Base products and product suites

Product	Function
Professional VisSim	Model-based design, simulation, testing, and validation of dynamic systems. A personal version, VisSim PE, is also available. VisSim PE limits diagram size to 100 blocks.
VisSim/Comm Suite	Simulates end-to-end communication systems at the signal level using 200+ communications, signal

	<p>processing, and RF blocks.</p> <p>Includes Professional VisSim and VisSim/Comm blockset.</p> <p>A personal version, VisSim/Comm Suite PE, is also available. VisSim/Comm PE limits diagram size to 100 blocks and limits the Communication blockset. See the VisSim/Comm datasheet for details.</p> <p>VisSim/Comm Suite add-on modules are available for real-time data acquisition (Red Rapids digital tuner card); modeling PCCC turbo codes, including UMTS specification; and for support of Bluetooth, 802.11 a/b/g (Wi-Fi), and ultrawideband wireless designs.</p>
VisSim/Embedded Controls Developer Suite	<p>Rapidly prototypes and creates embedded controls for DSPs, DSCs, and MSP430 microcontrollers. You can simulate and generate scaled, fixed-point ANSI C code, as well as code for on-chip peripherals.</p> <p>Includes Professional VisSim, VisSim/C-Code, VisSim/Fixed-Point, and one user-specified target support.</p> <p>A personal version, VisSim/Embedded Controls Developer PE, is also available. VisSim/Embedded Controls Developer PE limits diagram size to 100.</p>
VisSim Viewer (free)	<p>Lets you share VisSim models with colleagues and clients not licensed to use VisSim.</p>

Add-on modules

Add-On Module	Function
VisSim/Analyze	Performs frequency domain analysis of a linearized nonlinear subsystem.
VisSim/CAN	Interfaces with a USB CAN device to read and write CAN messages on the CAN bus.
VisSim/C-Code	Generates highly-optimized, ANSI C code that can be compiled and run on any platform that supports an ANSI C compiler.
VisSim/C-Code Support Library Source	Provides source code for the Support Library.
VisSim/Comm blockset	<p>Simulates end-to-end communication systems at the signal level using 200+ communications, signal processing, and RF blocks.</p> <p>A personal version, VisSim/Comm PE, is also available. VisSim/Comm PE is a subset of the Communication blockset. See the VisSim/Comm datasheet for details</p> <p>You can purchase VisSim/Comm add-on modules for real-time data acquisition (Red Rapids digital tuner cards); for modeling PCCC turbo codes, including UMTS specification; for support of Bluetooth, 802.11 a/b/g (Wi-Fi), and ultrawideband wireless designs.</p>
VisSim/Fixed-Point	Simulates the behavior of fixed-point algorithms prior to code generation and implementation of the algorithm on

	the fixed-point target.
VisSim/Knobs and Gauges	Provides dynamic gauges, meters, and knobs for process control, and measurement and validation systems.
VisSim/Model-Wizard	Generates transfer function model from historic or real-time data.
VisSim/Motion	Simulates motor control systems with customizable amplifiers, controllers, filters, motors, sensors, sources, tools, and transforms.
VisSim/Neural-Networks	Performs nonlinear system identification, problem diagnosis, decision-making prediction, and other problems where pattern recognition is important.
VisSim/OPC	Connects to any OPC server and log data or run a virtual plant in VisSim for offline tuning.
VisSim/OptimizePRO	Performs generalized reduced gradient method of parameter optimization.
VisSim/Real-TimePRO	Performs real-time data acquisition and signal generation using I/O cards, PLCs, and DCSs.
VisSim/Serial	Performs serial I/O with other computers.
VisSim/State Charts	Creates, edits, and executes event-based systems.
VisSim/UDP	Performs data exchange over the internet using UDP.
VisSim Viewer (free)	Lets you share VisSim models with colleagues and clients not licensed to use VisSim.

Resources for learning VisSim/CAN

For those of you that are new to VisSim, we have provided several free services to make your transition to VisSim fast, smooth, and easy:

- [Interactive webinars](#)
- [Sample diagrams](#)

Interactive webinars

Interactive webinars offer you the opportunity to meet with Visual Solutions product specialists who will introduce and demonstrate our software products live on your computer and answer any questions you have. Each webinar is approximately 45 minutes long. To learn more about our interactive webinars, go to <http://www.vissim.com/webinars/webinars.html>.

Sample diagrams

VisSim 9.0 includes a directory of fully documented sample diagrams. These diagrams illustrate both simple and complex models spanning a broad range of engineering disciplines, including aerospace, biophysics, chemical engineering, control design, dynamic systems, electromechanical systems, environmental systems, HVAC, motion control, process control, and signal processing.

To access sample diagrams

1. Click on the **Diagrams** menu in VisSim.

2. Click on **Examples > Applications**.

Training

Altair offers training sessions for learning and gaining expertise in VisSim and the VisSim family of add-on products. Training sessions are conducted at Altair training facility in Westford, MA, as well as at customer sites and as online webinars.

For information on setting up a training session, contact sales@vissol.com.

Installing VisSim/CAN

This section contains...

Installing USB CAN Peak device drivers

Before you install the VisSim/CAN you must install the USB CAN Peak device drivers.

Installing VisSim/CAN

Once the device drivers have been installed, run **setupVisSimCANPeak20.EXE** (contained on your VisSim/CAN CD or downloaded from the http://www.vissim.com/vissim_download.html).

After the install is complete, you can start VisSim and start communicating with your CAN device.

If you click on **Edit > Preferences** and choose the **Addons** tab, the VisSim/Peak add-on appears in the VisSim Addons list. The CAN PEAK read and write blocks appear under the **Blocks > Real Time** category, along with the CAN Config command.

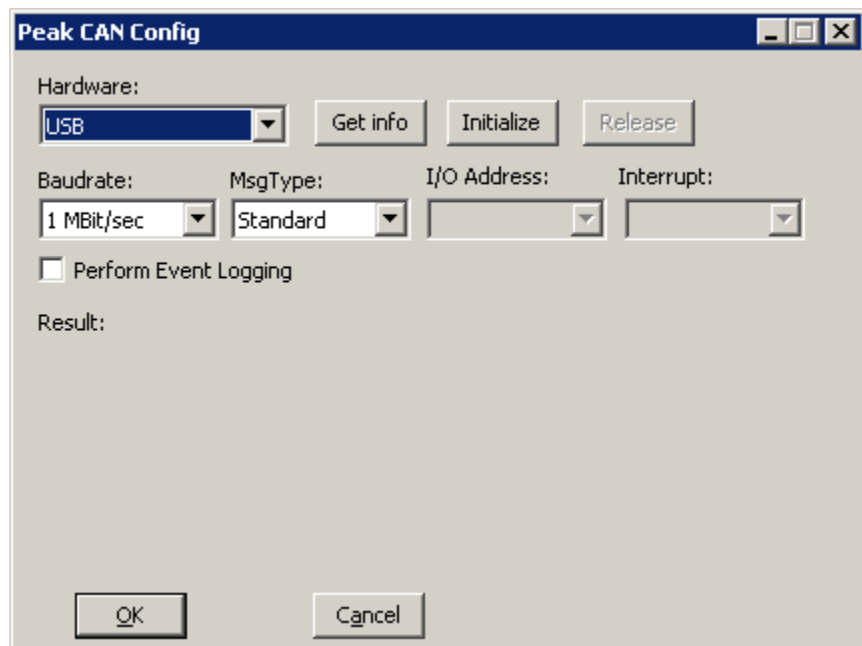
Using VisSim/CAN

The VisSim/CAN add-on module interfaces with a CAN (Controller Area Network) device that can be connected to any CAN bus. Using VisSim/CAN, you can exchange data between VisSim and any CAN device using the CAN PEAK Read and CAN PEAK Write blocks.

CAN PEAK Config command

Block Category: Real Time

The CAN Peak Config command is used to set baud rate and message type. To determine the correct settings for these parameters, refer to the device vendor documentation.



Hardware
Baud Rate
Msg Type

I/O Address

Interrupt

Perform Event Logging

Get Info Displays the current status of the CAN PEAK device.

Initialize Initializes the interface. Initialization normally occurs when you run a simulation. You can use the Initialize button to test the interface initialization.

CAN PEAK read block

The CAN PEAK read block reads data from the CAN bus.

CAN Receive Properties

Number of Data Outputs: 4

Message ID(11 bits): 0x21

Receive extended 29 bit frames

Masking Register (enter zero for no masking): 0x0

Byte Order: Little Endian

Data Pin Output Type

Pin: 1 Type: SCALED_INT

Radix Point: 4 Word Size: 16

Byte offset into CAN packet: 0

OK Cancel

Specifies the number of output pins on the CAN PEAK Read block. Each pin refers to a data item within the 8-byte CAN packet. Note that the packet length can be from 0 to 8 bytes.

Number of Data Outputs

Specifies the CAN message identifier. This can be from 0 to 0x7FF for 11 bit identifiers, or from 0 to 0x1FFFFFFF for extended 29-bit identifiers.

Message ID

The default is 11 bit

Receive Extended 29 Bit Frames

identifiers. Checking this box will result in the use of 29 bit identifiers.

Every bit set in a mask register is a “Don’t care” bit, that means this block will accept any message identifier received that matches bits in the Message ID except those bits set in the Mask. A mask of 0xFFFFFFFF will match all identifiers. A mask of 0 will match only identifiers exactly the same as the Message ID.

Masking Register

Little Endian is the same as the PC, so no data adjustment is done. Big Endian will cause the 8 byte data packet to be byte swapped.

Byte Order

Each data pin corresponds to a data item within the 8 byte data packet of a CAN message. For each pin, you can choose the byte offset and data type of the data element.

Data Pin Output Type

Selects the data pin.

Pin

Selects the data type for the pin.

Type

Selects radix point for Scaled Int data types.

Radix Point

Selects word length for Scaled Int data types.

Word Length

Selects the byte offset into the 8-byte CAN data packet.

Byte Offset into CAN Packet

CAN PEAK write block

The CAN PEAK write block writes data to the CAN bus. The top “Tx” pin must have the value 1 in order for the block to send a CAN packet. The remaining pins are data pins. The values presented on the data pins are stored into the 8 byte CAN packet buffer for transmission according to the data type and byte offset as setup in the Properties dialog discussed below.

CAN Transmit Properties

Number of Data Inputs: 4

Message ID (11 bits): 0x20

Send Extended 29 bit Frames

Data Length (bytes): 8

Auto Answer Mode

Set address dynamically

Swap Bytes

Pin Input Type

Pin: 1 Type: SCALED_INT

Radix Point: 4 Word Size: 16

Byte offset into CAN packet: 0

OK Cancel

Specifies the number of output pins on the CAN PEAK Write block. Each pin refers to a data item within the 8-byte CAN packet. Note that the packet length can be from 0 to 8 bytes.

Number of Data Outputs

Specifies the CAN message identifier. This can be from 0 to 0x7FF for 11 bit identifiers, or from 0 to 0x1FFFFFFF for extended 29-bit identifiers.

Message ID

The default is 11 bit identifiers. Checking this box will result in the use of 29 bit identifiers.

Send Extended 29 Bit Frames

Specifies the number of bytes in the data packet. It can be between 0 and 8 bytes.

Data Length

Causes a second pin to appear with the name "addr". This pin will provide the CAN address for the transmit destination. This value can be changed on the fly as the diagram is executed.

Set Address Dynamically

Causes the 8 byte data packet to be byte swapped on a 2 byte word basis.

Swap Bytes

Each input data pin corresponds to a data item within the 8 byte data packet of a CAN message. For each pin, you can choose the byte offset and data type of the data element.

Data Pin Input Type

Selects the data pin.

Pin

Selects the data type for the pin.

Type

Selects radix point for Scaled Int data types.

Radix Point

Selects word length for Scaled Int data types.

Word Length

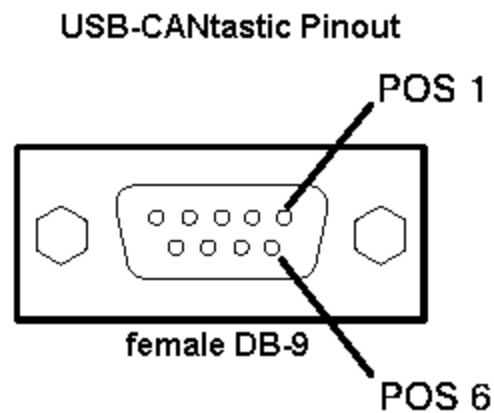
Selects the byte offset into the 8-byte CAN data packet.

Byte Offset into CAN Packet

CAN Device Pinout

This section contains...

Schematic



- Pos 1: Not Connected
- Pos 2: CAN_L
- Pos 3: CAN_GND
- Pos 4: SPARE1 (AN0 of PIC)***
- Pos 5: CAN_SHIELD
- Pos 6: GND***
- Pos 7: CAN_H
- Pos 8: SPARE2(AN1 of PIC)***
- Pos 9: +5V (from PC's USB)***

***OPTIONAL

Redistributing VisSim models with CAN elements

If you have purchased a VisSim/CAN redistribution license, you can distribute your VisSim models that contain VisSim/CAN elements to engineers and customers who do not have a VisSim/CAN license. It is a good idea to include a copy of this document when you send your models to fellow engineers and customers.

If you have purchased a Redistribution License, your Redistribution License Agreement is contained on your CD and a hardcopy was included with your product.

How to distribute VisSim/CAN models with the Viewer

You have several different options for distributing the VisSim/CAN redistribution license. Regardless of the distribution method you use, the end user must install the VisSim Viewer on his/her computer before installing the VisSim/CAN redistribution license.

To distribute the VisSim/CAN software

1. Make copies of the enclosed CD and mail to end user.
2. Send an email to the end user and attach the **setupVisSimCANPeak90.exe** file
3. Place the install file (**setupVisSimCANPeak90.exe**) on a corporate server

What the end user needs to view VisSim/CAN models

For end users not licensed to use VisSim, they would need to install the following products on their computer:

- VisSim Viewer
- VisSim/CAN redistribution license
- Your VisSim models with CAN elements

To install VisSim Viewer

1. Go to http://www.vissim.com/content/free_vissim_viewer_download_request_form.
2. Fill out the Download Form and click on the **SUBMIT** button.
3. Click on **Click Here To Download the Free VisSim Viewer**.

To install the VisSim/CAN redistribution license

If you have the CD, simply insert the CD into your CD drive. The install procedure automatically starts.

If you received an email with setupVisSimCANPeak80.exe attachment, save the .exe file to your hard drive and then run the .exe program.

Index

C

CAN Device Pinout 13
CAN PEAK Config command 7
CAN PEAK read block 8
CAN PEAK write block 10

H

How to distribute VisSim/CAN models with the Viewer
15

I

Installing USB CAN Peak device drivers 5
Installing VisSim/CAN 5
Interactive webinars 3
Introduction 1

R

Redistributing VisSim models with CAN elements 15
Resources for learning VisSim/CAN 3

S

Sample diagrams 3
Schematic 13

T

The VisSim product family 1
Training 4

U

Using VisSim/CAN 7

W

What is VisSim/CAN 1