MicroAutoBox III

Getting Started

Release 2021-A – May 2021

dSPACE

How to Contact dSPACE

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How to Contact dSPACE Support

If you encounter a problem when using dSPACE products, contact your local dSPACE representative:

- Local dSPACE companies and distributors: http://www.dspace.com/go/locations
- For countries not listed, contact dSPACE GmbH in Paderborn, Germany.
  Tel.: +49 5251 1638-941 or e-mail: support@dspace.de

You can also use the support request form: http://www.dspace.com/go/supportrequest. If you are logged on to mydSPACE, you are automatically identified and do not need to add your contact details manually.

If possible, always provide the relevant dSPACE License ID or the serial number of the CmContainer in your support request.

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.com/go/patches for software updates and patches.

Important Notice

Contents

About This Document

Content

This guide introduces you the MicroAutoBox III. It describes how to connect and register a MicroAutoBox III in a laboratory to access it using dSPACE software.

Furthermore, this guide provides information for MicroAutoBox II users.

Symbols

dSPACE user documentation uses the following symbols:

Symbol	Description
DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazard that, if not avoided, could result in property damage.
Note	Indicates important information that you should take into account to avoid malfunctions.
Tip	Indicates tips that can make your work easier.
	Indicates a link that refers to a definition in the glossary, which you can find at the end of the document unless stated otherwise.
	Precedes the document title in a link that refers to another document.

Naming conventions

dSPACE user documentation uses the following naming conventions:

%name% Names enclosed in percent signs refer to environment variables for file and path names.

< > Angle brackets contain wildcard characters or placeholders for variable file and path names, etc.

Special folders

Some software products use the following special folders:

Common Program Data folder A standard folder for application-specific configuration data that is used by all users.

`%PROGRAMDATA%\dSPACE\<InstallationGUID>\<ProductName>`

or

`%PROGRAMDATA%\dSPACE\<ProductName>\<VersionNumber>`

Documents folder A standard folder for user-specific documents.

`%USERPROFILE%\Documents\dSPACE\<ProductName>\<VersionNumber>`

Local Program Data folder A standard folder for application-specific configuration data that is used by the current, non-roaming user.

`%USERPROFILE%\AppData\Local\dSPACE\<InstallationGUID>\<ProductName>`

Accessing dSPACE Help and PDF Files

After you install and decrypt dSPACE software, the documentation for the installed products is available in dSPACE Help and as PDF files.

dSPACE Help (local) You can open your local installation of dSPACE Help:

- On its home page via Windows Start Menu
- On specific content using context-sensitive help via **F1**

dSPACE Help (Web) You can access the Web version of dSPACE Help at www.dspace.com/go/help.

To access the Web version, you must have a *mydSPACE* account.

PDF files You can access PDF files via the icon in dSPACE Help. The PDF opens on the first page.

Safety Precautions

Introduction

To avoid risk of injury and/or damage to the MicroAutoBox III, read and ensure that you comply with the following safety precautions. These precautions must be observed during all phases of system operation.

dSPACE General Safety Precautions

In addition to the safety precautions given in this document, read the dSPACE General Safety Precautions. This document describes the risks of injury and damage to the dSPACE hardware in general.

A printed document of the dSPACE General Safety Precautions is delivered together with your hardware. You can also find the document in PDF format on the dSPACE DVD.

Where to go from here

Information in this section

User Qualification and Intended Use

User qualification

Work on dSPACE hardware, and on the connected electric equipment, must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician, and in accordance with electrical engineering rules and regulations.

A skilled electrician is a person with sufficient technical training, comprehension, experience, and knowledge of the relevant regulations to assess the tasks assigned to them and to recognize possible dangers.

Intended use of the MicroAutoBox III

The MicroAutoBox III is intended to be used for the developing, researching, and testing of functions for electronic control units (ECU). Using MicroAutoBox III for purposes other than these (e.g., in vehicles intended for sale to consumers, or in machines as part of production machinery) is considered to be improper and noncontractual use.

The MicroAutoBox III must be used in a clean and dry environment (pollution degree 2, according to IEC 61010-1).

Connect only external devices with voltages inside the specified ranges. For the protected voltage ranges, refer to General Characteristics (MicroAutoBox III Hardware Installation and Configuration 🕮).

The MicroAutoBox III is a CE class A device. This equipment may cause interference in a residential installation. In this case the user is encouraged to perform appropriate measures to correct the interference. For more information on product compliance, refer to Certifications (MicroAutoBox III Hardware Installation and Configuration 🕮).

You are not allowed to open, modify, or service MicroAutoBox III unless the required instructions are explicitly stated in the user documentation or were sent to you by dSPACE Support in writing. Perform the instructions only if you have the required skills.

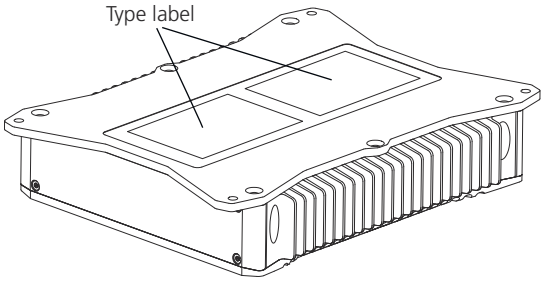
Type Label and Product Safety Labels

Introduction

The type label and product safety labels must be permanently attached to the product. If product safety labels are damaged or not clearly legible, replace them immediately. For replacement labels contact dSPACE Support.

Type label

The type label at the bottom clearly identifies the product. The information on the type label is required for using the product and for questions to dSPACE Support.



The type label provides the following information:

- Information to identify the product:
  Name of the product, product type, and serial number
- Operating voltage range
- Rated operating power
- Products with radio interfaces only: Regulatory information
- Contact information

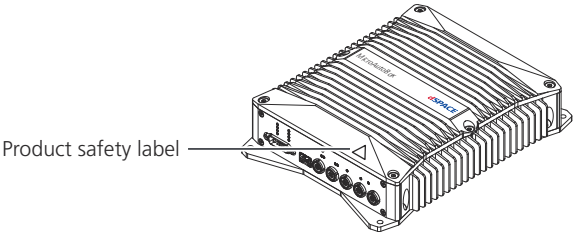
Symbols on the type label The following table describes the symbols used on the type label. Not all symbols are used on every product.

Symbol	Description
	Read the user documentation for your dSPACE product. This will give you all the information required to use your dSPACE product safely and efficiently. Keep the user documentation for future reference.
	The product complies with the requirements of the applicable EU directives.
	You must ensure that dSPACE hardware is disposed of in accordance with the applicable regional rules and regulations. You are strongly recommended to contact the regional waste management authorities to find a disposal or recycling center for the proper and environmentally sound disposal of dSPACE hardware (e-waste). Recycle or reuse dSPACE hardware wherever possible.

Symbol	Description
	The product complies with the requirements of the applicable Japanese radio equipment regulations. The type certifications are printed to the right of the symbol.

Product safety labels

The following illustration shows the location of the attached product safety label.



The following table describes the symbol used.

Symbol	Description
	The product can heat up during operation. ▪ Verify the temperature of the product before you touch it.

Safety Precautions for Connecting to Power Supply/Vehicle Battery

Using the correct operating voltage

The MicroAutoBox III must be supplied with the correct operating voltage to avoid electric shock and malfunctions.

- Make sure that the power supply/vehicle battery does not exceed the maximum operating voltage. The operating voltage range is printed on the type label at the bottom of the MicroAutoBox III.
- Do not use plugs for the power supply cable that can lead to an accidental connection to hazardous supply voltages, such as the mains voltage.
- Do not use the preconfigured power supply cable from dSPACE at supply voltages > 32 V DC.

  For operation with DC voltages > 32 V DC, you must build a power supply cable. For building a power supply cable, refer to Building the Power Supply Cable (MicroAutoBox III Hardware Installation and Configuration 🕮).
- If the Embedded PC is built in a MicroAutoBox III, the power input connector of the Embedded PC is covered with a protective cap. Do not remove the protective cap.
- To avoid hardware damage and the risk of electric shock, do not connect the MicroAutoBox III to an AC power source.

Building the power supply cable

A vehicle battery can supply high currents. If a short circuit occurs, e.g., in the cable harness, the current of the vehicle battery (power supply) generates heat in the connected cables. The heat might cause a fire.

- Insert fuses into the power supply cable and other cables that are connected to the battery/power supply to avoid an electrical fire.
- Locate the fuses close to the battery/power supply.
- Choose fuse ratings that ensure that the fuses break the circuit if the connected cables are loaded with the maximum currents supported by the cross sections of the cables used.
- Make sure that you use flame-retardant cables specified for temperatures up to 105 °C (220 °F) that were tested in conformity with IEC 60332-1-2, IEC 60332-2-2, or UL VW-1.
- Make sure that you use flame-retardant connectors specified for temperatures up to 105 °C (220 °F) and V-2 classified in conformity with IEC 60695-11-10 or UL 94.

Connecting to a vehicle battery

Even a brief disconnection of the battery during engine operation can cause the vehicle generator to generate hazardous voltages of more than 100 V (load dump).

- Turn off the vehicle engine before connecting or disconnecting the vehicle battery.

Batteries cannot be switched off. Therefore, locate a disconnect switch in the power supply cabling:

- Use an all-pole disconnect switch that matches the rating of the MicroAutoBox III.
- Make sure that the disconnect switch can be reached by the user in case of an emergency.

Using power supply cables with non-insulated ends

Using a power supply cable with non-insulated ends can lead to an electric shock when connecting the MicroAutoBox III to an energized power supply.

The connection of the cable is comparable to switch bouncing. The bouncing, the inrush current, the inductivity of the cable, and the input circuit of the MicroAutoBox III can lead to a hazardous voltage.

- Make sure that the power supply is voltage-free before connecting the MicroAutoBox III.

  If you use a vehicle battery, make sure that the disconnect switch is open. For more information on the disconnect switch, refer to Connecting a vehicle battery (MicroAutoBox III Hardware Installation and Configuration 🕮).

Powering a MicroAutoBox III with a built-in Cooling Unit

Voltages that are connected to the power input connector of the MicroAutoBox III Cooling Unit are directly looped through to its power output connector.

- Make sure that the power output connector of the Cooling Unit is connected to the power input connector of the MicroAutoBox III before you connect the laboratory power supply/vehicle battery.
- The screws of the power output connector must always be tight when you power up the Cooling Unit. Do not loosen the screws before the power supply/vehicle battery is disconnected.
- The cable of the power output connector must not be kinked or damaged.

Related topics

Basics

Building the Power Supply Cable (MicroAutoBox III Hardware Installation and Configuration 🕮)

Safety Precautions for Installing the MicroAutoBox III

Installing or uninstalling the MicroAutoBox III

You install and uninstall the MicroAutoBox III at your own risk. Any damage to or malfunction of dSPACE hardware caused by improper installation or uninstallation is not covered by the warranty, unless the handling and installation instructions are shown to be defective.

For example, installation work includes:

- Mounting a module on a board.
- Connecting/disconnecting external devices and the power supply.
- Connecting/disconnecting break-out boxes.
- Connecting/disconnecting dSPACE ECU communication and bypass interfaces.

Before doing any installation or uninstallation work, observe the following points:

- Check the MicroAutoBox III for external damages. You must not put into operation any damaged hardware.
- Disconnect the power supply/vehicle battery.
- Disconnect the external devices from the MicroAutoBox III.

  In case of a fault, connected external devices might conduct dangerous high voltage to the MicroAutoBox III or parts of the circuitry.

The safety precautions in this document must be carried out for installation work and for system operation.

Handling hardware with electrostatic sensitive devices

dSPACE hardware contains sensitive electronic devices. There is a risk of damaging the hardware or reducing its lifetime due to electrical fields or electrostatic discharge (ESD) that occur on touch. To avoid this risk, take the following precautions:

- Only qualified persons with knowledge of protective measures for electrostatic sensitive devices are allowed to unpack, install, or remove sensitive electronic devices.
- During the transport and storage of a sensitive electronic device, place it in closed ESD packaging.
- While handling a sensitive electronic device, place it on a properly grounded workstation, such as a special ESD desk or desk mat.
- You must ensure potential equalization between the environment and you, e.g., by wearing a grounded ESD wristband.
- Do not touch the board or the contacts of the connectors, even after installing the sensitive electronic device.

Connecting and disconnecting external devices

To prevent damage to the hardware:

- Apply voltages/currents to the connector pins only inside the specified ranges.
- Do not connect or disconnect any devices while the MicroAutoBox III is powered up and/or external devices are switched on. Make sure that external devices are turned off beforehand.
- Make sure that the wiring material fulfills the required characteristics.
- Before you connect an external device to the MicroAutoBox III, use measurement instruments, such as an oscilloscope or a tester device, to verify the I/O signals generated by your MicroAutoBox III. If you cannot test the I/O signals, ensure that no one is in the potential danger zone of the device (test bench, etc.) when the changes first take effect. This can also be necessary if you have updated the firmware or changed the cable harness via a break-out box.
- Do not use radio connections for safety-relevant functions. The performance of radio connections can be significantly reduced or the connection can be lost due to radio dead spots, insufficient radio range, radio disturbances, or radio shadow.

The MicroAutoBox III provides electrical energy at the I/O pins, which can cause a fire if external components such as sensors/actuators are not appropriately connected. This particularly concerns the VSENS, VBATprot, and the USB ports pins.

- To prevent a fire, apply the general fire safety regulations, e.g., supervise the operation, remove fire loads, and use fire-proof materials and enclosures.

Connecting to local area networks (LAN)

All the Ethernet ports of the MicroAutoBox III contain safety extra-low voltage (SELV) circuits, which must be connected only to other SELV circuits.

- To avoid electric shock, do not connect the Ethernet ports of the MicroAutoBox III to non-SELV circuits, e.g., telecommunication network voltage (TNV) circuits.

- The LAN or LAN segment of the MicroAutoBox III and all connected equipment must be part of the same low-voltage power distribution system.
- Do not use RJ45 connectors of wide area network (WAN) ports, because WAN ports can contain TNV circuits.
- LAN cables can occasionally be subject to hazardous transient voltages, such as lightning or disturbances in the electric utilities power grid. Handle exposed metal components of the network with caution.

Safety Precautions for Using the MicroAutoBox III

Observing environmental conditions

Make sure that the following environmental conditions are fulfilled when using the MicroAutoBox III:

- Use the MicroAutoBox III only in a normal clean and dry environment and avoid condensation.

  According to IEC 61010-1, using MicroAutoBox III in wet locations (i.e., an electroconductive liquid is present that reduces the human impedance between the electric contacts of the hardware and the user) can result in electric shock due to hazardous voltages or can damage the hardware. Ensure that the MicroAutoBox III is not put into operation in an environment with a pollution degree higher than 2 according to IEC 61010-1.
- Use the MicroAutoBox III only at an altitude below 2,000 m.

  The air section and current leakage path changes at altitudes higher than 2,000 m, which reduces the product safety.
- Do not use the MicroAutoBox III with damaged cables.

  Route all the external cables so that they are neither likely to be walked on nor pinched by items placed upon or against them.

  Replace any damaged cables.
- Observe the operating temperature range of the MicroAutoBox III. Refer to General Characteristics (MicroAutoBox III Hardware Installation and Configuration 🕮).

Guidelines for safe in-vehicle use of dSPACE products

Any in-vehicle use of dSPACE products in line with the contractual purposes requires the use of enclosed test tracks that are specially safety-secured for the specific purpose, i.e., with appropriately restricted access and additional appropriate safety measures.

If you intend to use dSPACE products outside enclosed tracks, you have to check with the relevant authorities in your country under which circumstances this is possible. You and the local authorities involved bear full responsibility for this type of use.

You must take appropriate measures to ensure that the overall system enters a safe state if a dangerous situation occurs, e.g., by implementing emergency shutdown or a limp-home mode. This particularly applies in the following cases:

- Where safety-critical interventions that affect vehicle behavior are performed, e.g., the stimulation of a bus system, such as CAN, or the calibration or bypassing of in-vehicle electronic control units (ECUs) that control powertrain, chassis, or body systems.
- Where dSPACE products are deployed in conjunction with ECUs that can pose a hazard if they malfunction.

Accordingly, the guidelines apply to the use of dSPACE products in aircraft or vessels in compliance with the contractual purposes.

Avoiding interference to radio communication devices

The MicroAutoBox III can provide a WLAN radio interface. An improper installation or unauthorized use of radio interfaces can cause harmful interference with radio communication devices:

- If you operate the WLAN interface in the 5 GHz frequency range, the MicroAutoBox III is restricted to indoor use.
- Attach only the delivered antennas to the WLAN interfaces (). Use only antennas that are provided by dSPACE for this product.

Observing workplace regulations

To avoid the risk of personal injury and hardware damage, you have to follow the workplace regulations defined by the national law of your country.

For example:

- Do not use electric devices near explosive materials or flammable fluids, gases, or dusts.
- Do not use electric devices outside the environmental conditions described in the user documentation.

Avoiding burns

The MicroAutoBox III can heat up during operation.

- Verify the temperature of the housing before you touch it, especially if the environment temperature is high.

Protecting the data privacy

The MicroAutoBox III provides memory components that can store non-volatile data. To avoid the unauthorized propagation of non-volatile data, clear the memory before you pass the MicroAutoBox III to another person.

Non-volatile memory is used, for example, for real-time applications, which will instantly start when powering on the hardware, FPGA applications, or explicitly implemented non-volatile data handling.

Safety Precautions for Using MicroAutoBox Break-Out Boxes

Working with break-out boxes

Depending on the connected devices, there can be hazardous voltages on the contacts of the boxes caused by failures.

- Do not touch bare contacts, connector pins, or any connected terminals and devices while the system is powered.

Changing the existing cable harness via a break-out box can cause uncontrolled movements of connected devices or damage them.

- Before changing the cabling, think through the effects of the changes you are planning.
- Make sure that no one is in the potential danger zone of the device (test bench, etc.) when the changes first take effect.

Connecting devices

- Do not connect any high-voltage devices to the I/O connectors of the break-out box.
- Do not apply voltages or currents outside the specified ranges of the used MicroAutoBox III to the terminal points of the break-out boxes.
- Do not connect or disconnect sensors or actuators while the power supply of the MicroAutoBox III or the power supply of any connected device is switched on.
- Observe all safety precautions described in the documentation of the connected devices.

The break-out box provides electrical energy at the I/O pins, which can cause a fire if external components such as sensors/actuators are not appropriately connected. This particularly concerns the VSENS and VBATprot pins.

- Apply the general fire safety regulations, e.g., supervise the operation, remove fire loads, and use fire-proof materials and enclosures.

Installation location

- Do not use the break-out boxes in the vehicle's engine compartment.
- Use the break-out boxes only in dry locations and avoid condensation.

  The break-out boxes are not moisture-proof. They must not be moistened by any liquids.

Safety Precautions for Shipping a MicroAutoBox III

Shipping a MicroAutoBox III

Observe the following when shipping a MicroAutoBox III:

- The packaging must be stable and withstand a 1.2 m (47 in.) drop test.
- The packaging must bear the *Lithium Battery Mark* label with UN number 3091 and a phone number of your company for further information.

  A person must be available at the phone number provided who can provide information about the device being sent. The phone number must begin with the country code.
- The *Lithium Battery Mark* label must be at least 110 mm (4.4 in.) high and at least 120 mm (4.8 in.) wide.
- If the MicroAutoBox III is shipped by plane, enter the following note to the *Nature and Quantity of Goods* field of the airbill:

  Lithium metal batteries in compliance with Section II of PI 970

For battery characteristics, refer to Battery Characteristics (MicroAutoBox III Hardware Installation and Configuration 🕮).

Safety Precautions for Disposing dSPACE Hardware

Disposing a MicroAutoBox III

You must ensure that dSPACE hardware is disposed of in accordance with the applicable regional rules and regulations. You are strongly recommended to contact the regional waste management authorities to find a disposal or recycling center for the proper and environmentally sound disposal of dSPACE hardware (e-waste). Recycle or reuse dSPACE hardware wherever possible.

Battery information Batteries are installed to the following boards:

- DS1403 Processor Board: A Lithium battery is permanently installed to the board.

  If you are shipping the MicroAutoBox III to a disposal or recycling center, observe the notes on shipment. Refer to Safety Precautions for Shipping a MicroAutoBox III on page 17.

  For battery characteristics, refer to Battery Characteristics (MicroAutoBox III Hardware Installation and Configuration 🕮).

- Embedded PC: A lithium manganese dioxide coin cell battery is permanently installed.

Introduction to the MicroAutoBox III

Where to go from here

Information in this section

Basic Information on the MicroAutoBox III to Get Started

Field of application

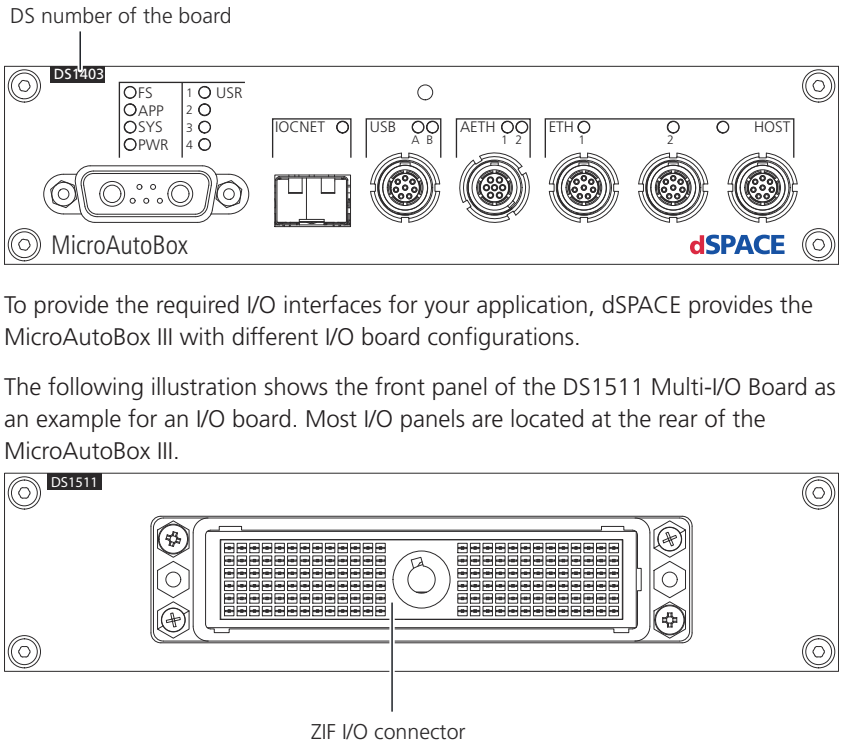
The MicroAutoBox III combines the advantages of a rapid control prototyping (RCP) system with those of an automotive electronic control unit (ECU). Therefore, it is ideally suited as hardware for prototyping in a vehicle.

The MicroAutoBox III operates without user intervention. It is suited for use as an in-vehicle real-time system. You can temporarily connect a PC or notebook for program download, data analysis, and calibration.

Basic components of a MicroAutoBox III

The MicroAutoBox III consists of a DS1403 Processor Board and at least one I/O board (DS15xx).

The processor board executes the real-time application and provides the interface to the host PC. The following illustration shows the panel of the processor board. The panel is located at the front of the MicroAutoBox III.



To provide the required I/O interfaces for your application, dSPACE provides the MicroAutoBox III with different I/O board configurations.

The following illustration shows the front panel of the DS1511 Multi-I/O Board as an example for an I/O board. Most I/O panels are located at the rear of the MicroAutoBox III.

Information for MicroAutoBox II users

You implement and create real-time applications for MicroAutoBox III using ConfigurationDesk instead the Real-Time Interface (RTI). For more information, refer to Information for MicroAutoBox II Users on page 35.

System Requirements to Get Started

Host PC requirements

The host PC is a standard PC on which the dSPACE test and experiment software is installed on.

For the minimum hardware requirements, refer to Host PC Hardware (Installing dSPACE Software 🕮).

For general host PC requirements, refer to Appendix: System Requirements (Installing dSPACE Software 🕮).

Software requirements

At least one of the following dSPACE software products is required to get started with a MicroAutoBox III:

- ConfigurationDesk

  ConfigurationDesk lets you implement and build real-time applications by means of a signal chain using graphical elements.

- ControlDesk

  ControlDesk is a universal, modular experiment and instrumentation software for ECU development.

Required hardware

The following hardware is required to get started with the MicroAutoBox III in a laboratory:

- A MicroAutoBox III.
- A laboratory power supply.

  For the required power and supply voltage, refer to the type label at the bottom of the MicroAutoBox III.
- The CB6073PW power supply cable that is part of the MicroAutoBox III package contents.
- The ETH_CAB1 Ethernet Connection Cable that is part of the MicroAutoBox III package contents.

Related topics

Basics

Requirements on the Host PC (MicroAutoBox III Hardware Installation and Configuration 🕮)

Putting the MicroAutoBox III into Operation

Where to go from here

Information in this section

How to Prepare the Host PC

Objective

Preparing the host PC to use the MicroAutoBox III and to open the web interface for basic configurations.

Workflow

Observe the following workflow when preparing the host PC:

- Install the required software. Refer to Part 1 on page 24.
- Set a static IPv4 address for the host PC to connect the MicroAutoBox III directly in a peer-to-peer connection. Refer to Part 2 on page 24.

Part 1

To install the required software

1. Install at least one of the following dSPACE software products on the host PC:
   - ConfigurationDesk
   - ControlDesk

   For instructions, refer to How to Install dSPACE Software (Installing dSPACE Software 🕮).

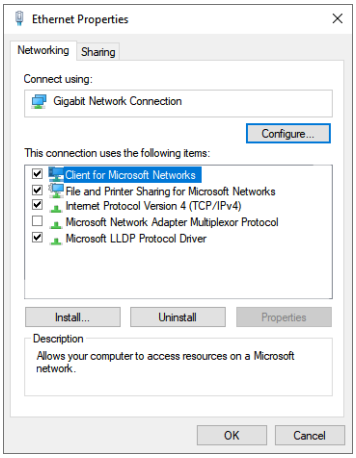
   Windows firewalls are automatically adapted during the installation of dSPACE software.
2. If you are using third-party firewall software on the host PC, ensure that the TCP/IP communication of dSPACE software is not blocked. For more information on allowing communication, refer to Operating System (Installing dSPACE Software 🕮).

Part 2

To set a static IPv4 address

1. On the host PC, press **Win** + **R** to open the Run dialog.
2. Enter `ncpa.cpl`. The Network Connections page opens.
3. Righ-click on the local area network (LAN) adapter to be used and select Properties.

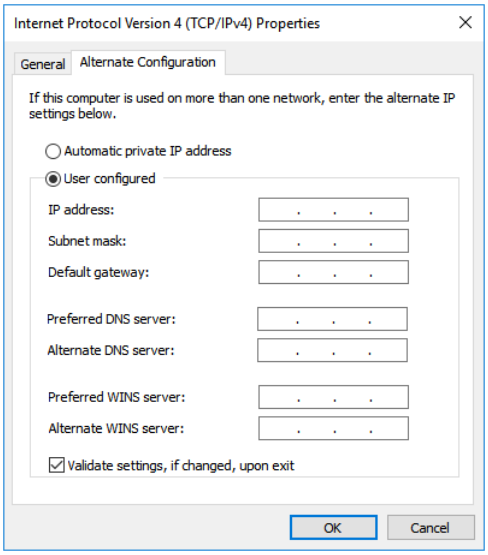
   The properties dialog opens.



4. Select the Internet Protocol Version 4 (TCP/IPv4) item and click Properties.

   The Internet Protocol Version 4 (TCP/IPv4) Properties dialog opens.

5 Open the Alternate Configuration tab.



6 Enter the following alternate IPv4 configuration.
- IP address: Any IP address in the range `192.168.140.1` … `192.168.140.254`, except the following addresses:
  - `192.168.140.10`: Default IP address of the MicroAutoBox III.
  - `192.168.140.4`: Recommended IP address of an optional MicroAutoBox III Embedded PC.
- Subnet mask: `255.255.255.0`

Result

You installed the required software and prepared the host PC to access the MicroAutoBox III in a peer-to-peer connection.

Note

To use the alternate IPv4 configuration in a peer-to-peer connection, the configured Ethernet adapter must not be connected to an Ethernet network that provides a DHCP server.

How to Power the MicroAutoBox III

Objective

Connecting the MicroAutoBox III to a laboratory power supply to get started.

Required material

The following material is required to power the MicroAutoBox III:

- A laboratory power supply.

  The required power and supply voltage that must be provided by the laboratory power supply depends on the installed boards. Refer to the type label at the bottom of the MicroAutoBox III or to General Characteristics (MicroAutoBox III Hardware Installation and Configuration 🕮).
- The CB6073PW power supply cable that is part of the MicroAutoBox III package contents.

Avoiding electrical fire

⚠ CAUTION

Operating preconfigured power supply cables above 32 V DC can lead to injuries and/or material damage

An electrical fire might cause personal injury or material damage.

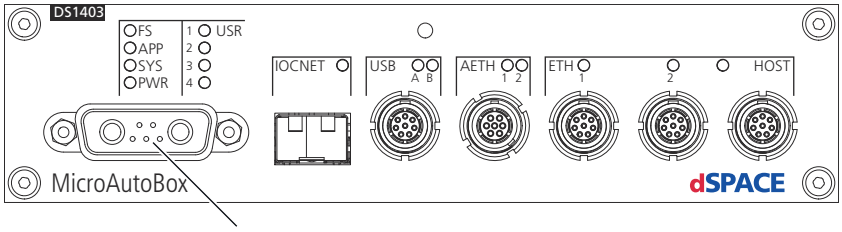
- Do not use the preconfigured power supply cable from dSPACE at supply voltages > 32 V DC.

  For operation with DC voltages > 32 V DC, you must build a power supply cable. For building a power supply cable, refer to Building the Power Supply Cable (MicroAutoBox III Hardware Installation and Configuration 🕮).
- Always replace a defective fuse of the preconfigured power supply cable by a fuse with the same ratings.

Method

To power the MicroAutoBox III

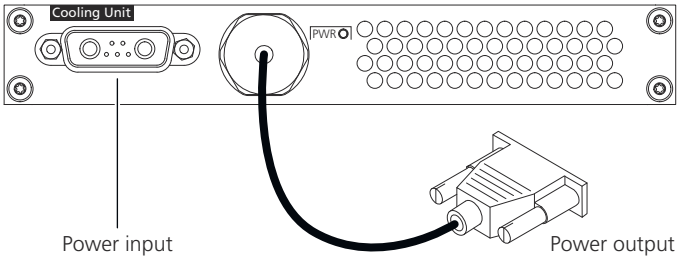
1. Make sure that the laboratory power supply is switched off.
2. Connect the Sub-D connector of the CB6073PW power supply cable to the Power input connector of the MicroAutoBox III.



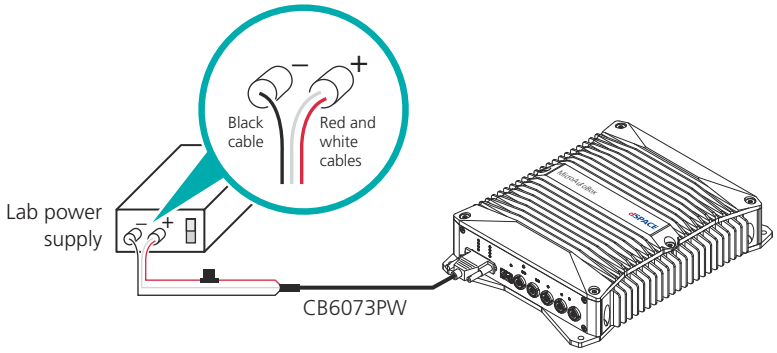
Power input connector

If you use a MicroAutoBox III with a built-in Cooling Unit, the power input connector of the Cooling Unit is used to power the MicroAutoBox III.

- Make sure that the power output connector of the Cooling Unit is connected to the power input connector of the DS1403.
- Connect the CB6073PW cable to the power input connector of the Cooling Unit.



3 Connect the wires to the laboratory power supply as follows:
   - Connect the red wire and the white wire to the positive pole.
   - Connect the black wire to the negative pole.



Result

You connected the power supply to the MicroAutoBox III. Switching on the laboratory power supply also switches on the MicroAutoBox III.

Next step

You can now connect the MicroAutoBox III to the host PC via Ethernet. Refer to How to Connect the MicroAutoBox III Directly to the Host PC on page 27.

Related topics

Basics

Building the Power Supply Cable (MicroAutoBox III Hardware Installation and Configuration 🕮)
Powering Features (MicroAutoBox III Hardware Installation and Configuration 🕮)
Powering the Embedded PC with a Laboratory Power Supply (MicroAutoBox III Embedded PC Hardware Installation and Configuration 🕮)

How to Connect the MicroAutoBox III Directly to the Host PC

Objective

Connecting the Ethernet cable to access the MicroAutoBox III with the host PC.

Required material

The Ethernet ports of MicroAutoBox III are LEMO connectors. Adapter cables provided by dSPACE are required to connect the host PC. To get started, use the ETH_CAB1 Ethernet Connection Cable that is part of the MicroAutoBox III package contents.

Preconditions

The following preconditions must be fulfilled:

- The IP address of the MicroAutoBox III must be known.

  The default IP address of a MicroAutoBox III is `192.168.140.10`.

  If you do not know the IP address, refer to How to Set the Network Configuration via Command Prompt Window (MicroAutoBox III Hardware Installation and Configuration 🕮).
- The host PC must use a static IP address. For instructions on configuring a static IP address for the host PC, refer to How to Prepare the Host PC on page 23.
- The laboratory power supply is connected to the MicroAutoBox III. Refer to How to Power the MicroAutoBox III on page 25.

Workflow

Observe the following workflow to connect the MicroAutoBox III directly to the host PC:

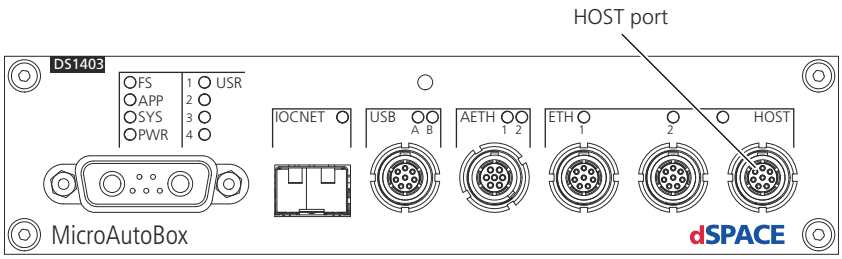
- Connect the host PC to the MicroAutoBox III via the ETH_CAB1 Ethernet Connection Cable. Refer to Part 1.
- Check the network configuration of the MicroAutoBox III for a direct Ethernet connection (peer-to-peer). Refer to Part 2.

  For registering the MicroAutoBox III in a peer-to-peer connection, the MicroAutoBox III must be set to static IP mode. In the default configuration, the MicroAutoBox III is set to the static IP mode.

Part 1

To connect the host PC to the MicroAutoBox III via an Ethernet cable

1 Connect the LEMO connector of the ETH_CAB1 Ethernet Connection Cable to the HOST port of the processor board.



2 Connect the RJ45 connector of the Ethernet cable to the Ethernet port of the host PC.

Part 2

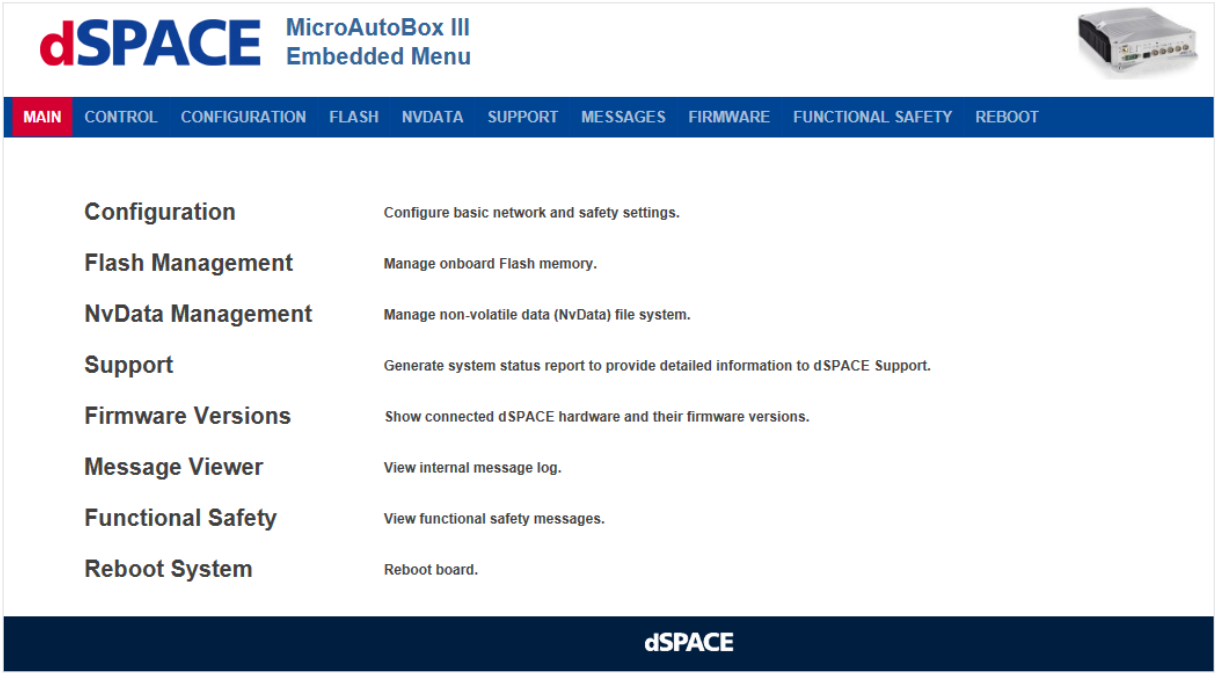
To check the network configuration for a peer-to-peer connection

1 Switch on the laboratory power supply.

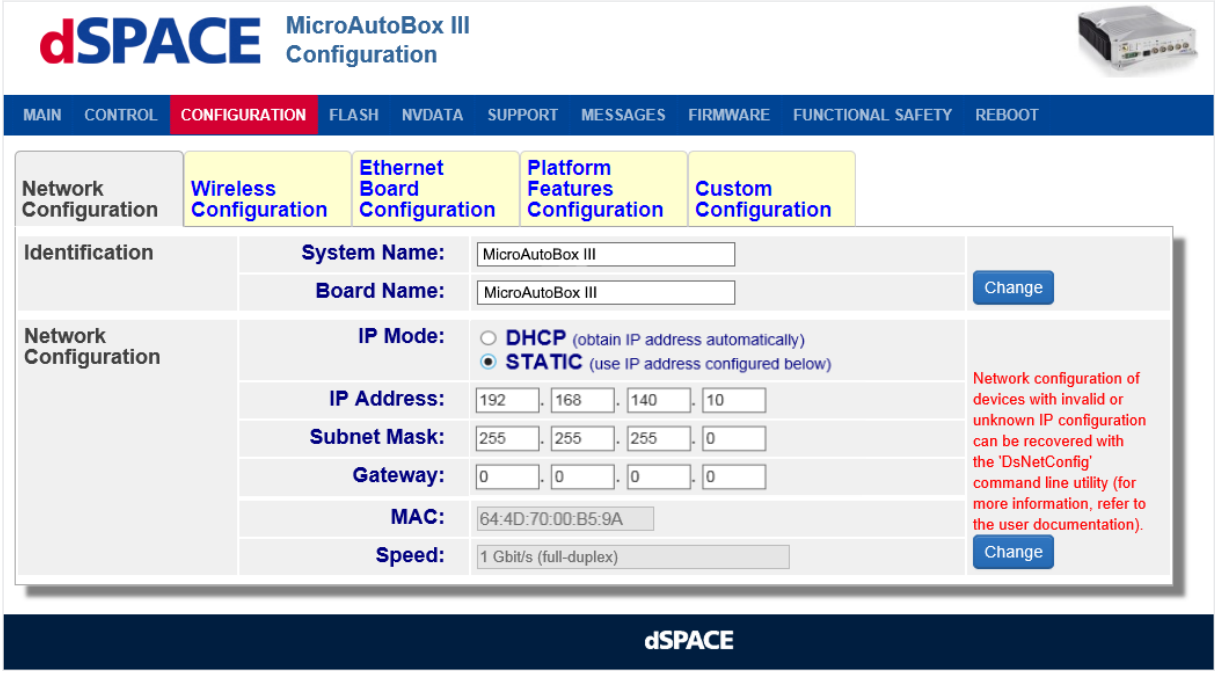
The MicroAutoBox III starts to boot. The MicroAutoBox III has booted completely when the SYS LED is green or flashes orange and green.

2 On the host PC, open an Internet browser and enter the IP address of the MicroAutoBox III.

The web interface of the MicroAutoBox III opens.

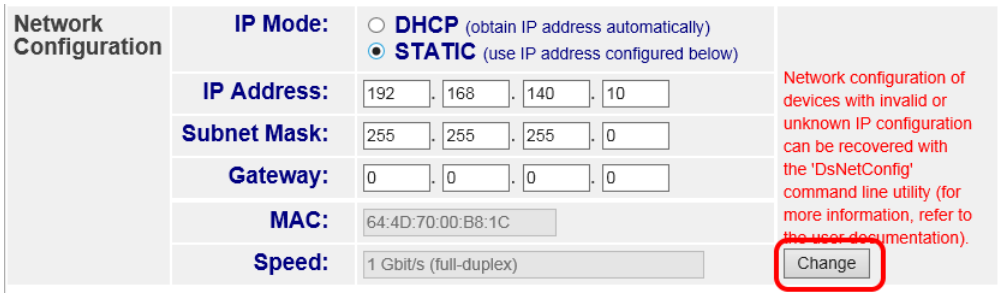


3 On the Configuration page, open the Network Configuration tab.



4 If the DHCP mode is selected, select the Static IP mode.

5 Click Change to change the network configuration.



6 Open the MicroAutoBox III System Reboot page and click Restart.
The new configuration becomes active after you restart the MicroAutoBox III.

Result

You connected the MicroAutoBox III directly to the host PC to access the MicroAutoBox III.

Next step

You can now register the MicroAutoBox III to access the MicroAutoBox III with the dSPACE software. Refer to How to Register the MicroAutoBox III on page 31.

Related topics

Basics

Setting Up the Connection to the Host PC (MicroAutoBox III Hardware Installation and Configuration 🕮)

How to Register the MicroAutoBox III

Objective

Accessing the MicroAutoBox III with the dSPACE software.

Basics on registering

To register a MicroAutoBox III, you can use one of the following products:

- ConfigurationDesk
- ControlDesk
- AutomationDesk

When registering the MicroAutoBox III or managing the registration data, use only one of these programs and close the other programs.

Preconditions

The following preconditions must be fulfilled:

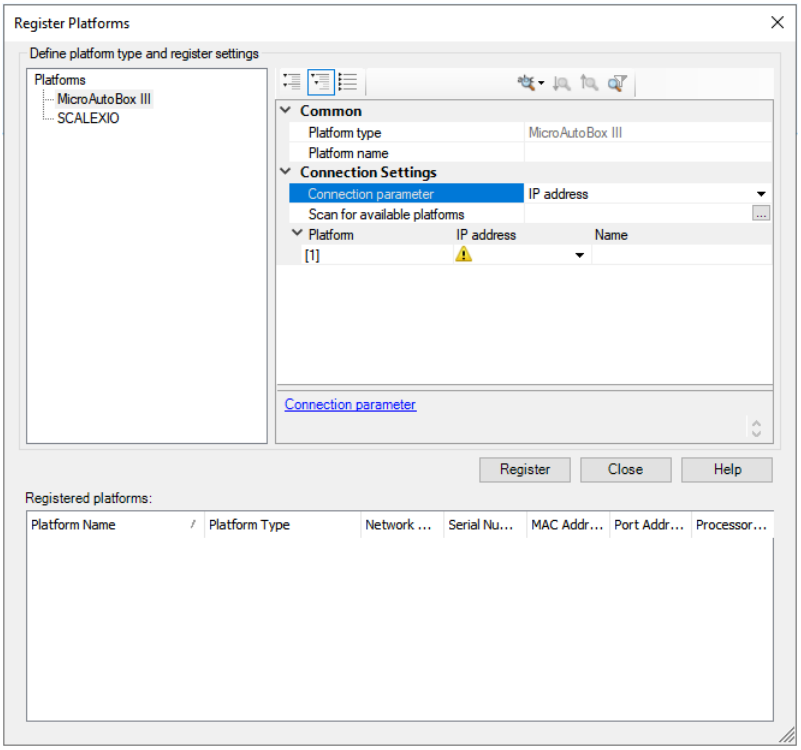
- The dSPACE software is installed on the host PC.
- The host PC is directly connected to the MicroAutoBox III.
- The MicroAutoBox III is switched on.

Method

To register the MicroAutoBox III

1. Start the dSPACE software, e.g., ConfigurationDesk.
2. On the Platforms ribbon, click Platform Management – Register Platforms.

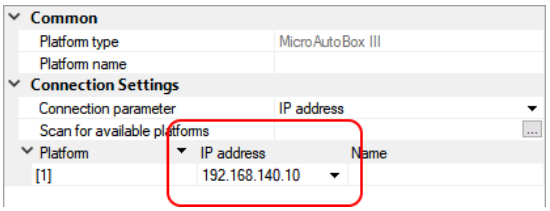
The Register Platforms dialog opens.



3 Select the MicroAutoBox III platform.

4 Make sure that the Connection parameter is set to IP address.

5 Enter the IP address of the MicroAutoBox III. The default IP address is `192.168.140.10`.



6 Click Register to complete the registration of the MicroAutoBox III.

The registered MicroAutoBox III is displayed with its registration settings in the Registered platforms list.

7 Click Close to close the Register Platforms dialog.

Result

You have registered the MicroAutoBox III. The dSPACE software created a platform for each item of registered hardware. The registration data is stored in the recent platform configuration.

The MicroAutoBox III is also registered for the other programs and available the next time you start it.

The **Platform Manager** displays the hardware topology of all the registered platforms. The hardware topologies are displayed in the order in which the registered hardware systems are detected in the network. Each hardware topology is displayed in a hierarchical structure.

Next steps

You can now make yourself familiar with the dSPACE software:

- Getting started with ConfigurationDesk:
  - For basic practices with ConfigurationDesk, refer to ConfigurationDesk Tutorial MicroAutoBox III 🕮.
  - For basic concepts of ConfigurationDesk, refer to Basic Concepts of ConfigurationDesk (ConfigurationDesk Getting Started 🕮).
- Getting started with ControlDesk:
  - For basic practices with ControlDesk, refer to Introduction to the Measurement and Recording Tutorial (ControlDesk Measurement and Recording 🕮).
  - For an overview of ControlDesk versions and modules, refer to ControlDesk Versions and Modules (ControlDesk Introduction and Overview 🕮).

Related topics

Basics

Basics on Registering Real-Time Hardware (ConfigurationDesk Real-Time Implementation Guide 🕮)

HowTos

How to Register a Platform (ControlDesk Platform Management 🕮)

Information for MicroAutoBox II Users

Where to go from here

Information in this section

Main Differences Between Modeling with RTI and ConfigurationDesk

Introduction

This provides you with the information you need if you previously worked with RTI.

Conceptual differences

Working with RTI If you work with RTI, the following applies:

- The Simulink model represents the application.
- The Simulink model is specific to exactly one of the supported platforms.
- The Simulink model contains the behavior model and RTI blocks representing specific I/O functionality.

Working with ConfigurationDesk If you work with ConfigurationDesk, the following applies:

- The Simulink model contains the behavior model but no I/O functionality. Generic interface blocks (called model port blocks) specify the inputs and outputs of the behavior model. I/O functionality is implemented in

ConfigurationDesk via function blocks that are mapped to the ports of the model port blocks.

- In ConfigurationDesk, you create a ConfigurationDesk project with one or more ConfigurationDesk applications. You can add multiple Simulink models or SIC files as behavior models to a ConfigurationDesk application.
- The model is not specific to a supported platform. You can use the same model with different ConfigurationDesk applications and with different I/O functionality.
- Executing multiple models in the same application process lets you combine multiple small behavior models into one real-time application without having to combine them into one overall model in Simulink.

RTI versus ConfigurationDesk

The following table shows the main differences between working with ConfigurationDesk and working with RTI:

Action	Working with RTI	Working with ConfigurationDesk
Hardware mapping	The hardware is implicitly defined by the added RTI block, for example, DIO_TYPE3_BIT_IN_BLx works only on a DS1511 I/O Board. The mapping is a setting in the RTI block.	The behavior model does not contain any information about the hardware. Suitable hardware is assigned and can be replaced in ConfigurationDesk.
Modeling asynchronous tasks	Asynchronous tasks are modeled via board-specific RTI **Interrupt** blocks.	Asynchronous tasks are modeled via the **Hardware-Triggered Runnable Function** block from the Model Interface Blockset. Each **Hardware-Triggered Runnable Function** block in the Simulink model has a representative in ConfigurationDesk that must be connected to the event port of a function block. A preconfigured task triggered by an I/O event is then available in ConfigurationDesk.
	Software-generated interrupts are made available as trigger sources for tasks via **Software Interrupt** blocks.	For each **Software-Triggered Runnable Function** block in the Simulink model, a predefined task with an assigned software event is available in ConfigurationDesk.
Triggering periodic tasks by an asynchronous event	The periodic rates of the Simulink model are indicated by RTI as timer tasks. Per default, all timer tasks are driven by a processor-board-specific timer interrupt. To overwrite this behavior, you can use the **Timer Task Assignment** block. This block lets an RTI Interrupt block drive the timer tasks.	In ConfigurationDesk, a task with an assigned timer event is created for the fastest periodic task of the Simulink model. For the other periodic tasks of the Simulink model, predefined tasks with an assigned software event are created in ConfigurationDesk. These tasks are triggered by the fastest periodic task. Instead of the timer event, you can assign an I/O event to the fastest periodic task. As a result, all the predefined tasks are triggered asynchronously.
Data acquisition service	By default, the data acquisition service is only activated for the base rate task[1)]. It can be activated for other tasks by using the **Data Capture** block.	By default, the data acquisition service is only activated for the base rate task. It can be activated for other tasks by using the **DAQ raster name** property in ConfigurationDesk.
Avoiding task overruns in the first simulation steps of the fastest timer task	The **FIRST_SIMSTEP_INCREASEMENT** option on the **Build Options** page (CPU options dialog) lets you avoid task overruns.	The **Time-Scaled Period** and **Time Scale Factor** properties of the global build settings in ConfigurationDesk let you avoid task overruns.

Action	Working with RTI	Working with ConfigurationDesk
		These settings let you specify the requirements of the real-time application in more detail.
Specifying the system target	If you work with RTI, you specify one of the available board-specific system target files and configure the modeling environment for the board-specific RTI blockset. The system target is automatically configured in a new behavior model if you let MATLAB set the configuration preferences automatically when activating an RTI platform for the first time. You can also modify these settings manually.	If you work with ConfigurationDesk, you use `dsrt.tlc` as the system target file. Alternatively, you can select the dSPACE Run-Time Target template from the Simulink Start Page to use a preconfigured model.
Starting the build process	You configure and start the build process in the behavior model. An initial configuration of the build options for a new behavior model is automatically set if MATLAB automatically sets the configuration preferences when you activate an RTI platform for the first time.	You configure and start the build process in ConfigurationDesk.[2] ConfigurationDesk adapts the settings in the behavior model to the specific requirements. Some settings are therefore overwritten by predefined ConfigurationDesk settings. During the build process, the model code is generated and then ConfigurationDesk compiles and links it to the final real-time application. If you add a Simulink model to a ConfigurationDesk application via a Simulink implementation container (SIC file), the SIC file already contains the generated code for the Simulink model. The build process in ConfigurationDesk generates the code for the I/O functions, and then compiles and links the model code provided by the SIC file and the code generated for the I/O functions.
Downloading the application	Optionally, RTI downloads the application after the build.	Optionally, ConfigurationDesk downloads the application after the build. You can configure the download behavior according to your requirements.

[1] The base rate task is the fastest periodic task in the Simulink model.
[2] Alternatively, you can start the build process from the ConfigrationDesk menu of the Simulink model.

Related topics

HowTos

How to Migrate Models of the MicroAutoBox II 37

How to Migrate Models of the MicroAutoBox II

Objective

Reusing RTI models of the MicroAutoBox II for the MicroAutoBox III.

Behavior model contains only Simulink blocks

If a model does not contain any RTI blocks, you can use the model in ConfigurationDesk without any modifications. You implement the interface to the function blocks in ConfigurationDesk via the Model Interface Package for Simulink. Refer to Creating the Interface of Behavior Models (Model Interface Package for Simulink - Modeling Guide 🕮).

When you start the build process in ConfigurationDesk, all the required configuration parameters in the behavior model are set automatically.

Model migration utility

A model migration utility can support certain migration steps during the migration process. For more information, refer to www.dspace.com/go/MABXIIIMigration.

Preconditions

The following preconditions must be fulfilled:

- ConfigurationDesk is installed.
- Model Interface Package for Simulink is installed.
- You familiarized yourself with ConfigurationDesk. Refer to Creating a Logical Signal Chain (ConfigurationDesk Getting Started 🕮) and Creating a Real-Time Application: Starting with a Simulink Behavior Model (ConfigurationDesk Getting Started 🕮).
- MATLAB®/Simulink® is installed.

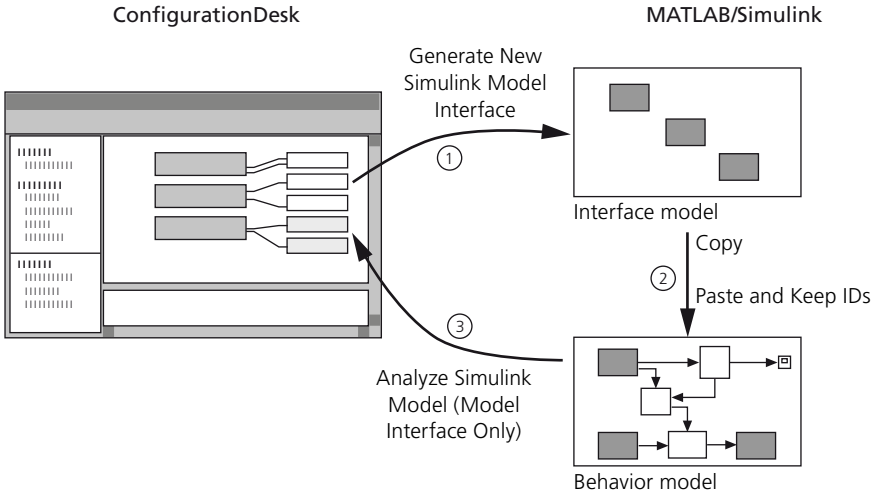
Method

To migrate models of MicroAutoBox II

1. Replace the I/O functionality that is implemented via RTI blocks in the Simulink model with function blocks in ConfigurationDesk:
   - For comparable function blocks, refer to MicroAutoBox II RTI Blocks vs. MicroAutoBox III Function Blocks on page 40.
   - For instructions on adding function blocks, refer to How to Add Function Blocks to the Signal Chain via Function Browser (ConfigurationDesk Real-Time Implementation Guide 🕮).

   The remaining Simulink model without I/O functionality is called behavior model.
2. Configure the function blocks, for example, assign the channels of MicroAutoBox III to the function blocks. Refer to Configuring Function Blocks (ConfigurationDesk Real-Time Implementation Guide 🕮).
3. Replace the interrupts by I/O events. Refer to Modeling Asynchronous Tasks (ConfigurationDesk Real-Time Implementation Guide 🕮).
4. Extend the signal chain in ConfigurationDesk by adding model port blocks. For instructions, refer to How to Add Model Port Blocks to the Signal Chain via Function Blocks (ConfigurationDesk Real-Time Implementation Guide 🕮).

5 Transfer the model port blocks of the ConfigurationDesk model interface to the Simulink behavior model.



The following workflow steps are required:

1. Generating interfaces for the Simulink behavior model

   The unresolved model port blocks in your ConfigurationDesk application must be generated as model port blocks in a new Simulink model called the interface model. You can do so by using the **Generate New Simulink Model Interface** command in ConfigurationDesk.

2. Copying model port blocks from the interface model to the Simulink behavior model

   You can copy the generated model port blocks blocks from the interface model and paste them to the Simulink behavior model. For this purpose, you must use the standard Copy command as well as the **Paste and Keep IDs** command from the **Model Port Blocks** menu.

3. Analyzing interfaces of the Simulink behavior model

   To make the changes in the Simulink behavior model known to ConfigurationDesk, you must analyze the model interface by executing **Analyze Simulink Model (Model Interface Only)** command in ConfigurationDesk. During model analysis, the model topology of the active ConfigurationDesk application is updated with the model port block data of the Simulink behavior model.

For more information on the steps described above, refer to the following topics:

- How to Transfer Unresolved Model Port Blocks to a Simulink Behavior Model via an Interface Model (ConfigurationDesk Real-Time Implementation Guide 🕮)
- Adding the Generated Model Interface to Your Behavior Model via an Interface Model (Model Interface Package for Simulink - Modeling Guide 🕮)

Result

You replaced the RTI blocks with function blocks and implemented a new model interface with model port blocks. The new model port blocks in ConfigurationDesk are resolved and used for code generation from now on.

Related topics

Basics

Features of the Model Interface Package for Simulink (Model Interface Package for Simulink - Modeling Guide 🕮)

MicroAutoBox II RTI Blocks vs. MicroAutoBox III Function Blocks

Introduction

You can reuse RTI models for MiroAutoBox II by deleting the RTI blocks in the Simulink model and adding comparable function blocks in ConfigurationDesk.

When the function block are added to the signal chain, you can generate the interface to the Simulink model in ConfigurationDesk.

For adding function blocks to the signal chain, refer to Implementing I/O Functionality (ConfigurationDesk I/O Function Implementation Guide 🕮).

For generating the model interface, refer to Basics on Adding Model Port Blocks to the Signal Chain (ConfigurationDesk Real-Time Implementation Guide 🕮).

Tip

A model migration utility can support certain migration steps during the migration process. For more information, refer to www.dspace.com/go/MABXIIIMigration.

Minimum ConfigurationDesk version

ConfigurationDesk 6.4, Release 2019-B, is required to support the MicroAutoBox III.

Overview

RTI blocks and their comparable function blocks in ConfigurationDesk are grouped according to their functionality:

A/D conversion

The following table shows comparable function blocks for replacing RTI blocks supporting A/D conversion.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
ADC_TYPE4_BLx	▪ Single conversion: Voltage In ▪ Burst conversion: Voltage Signal Capture (ADC Type 4) ▪ External trigger: Trigger In	Scaling of conversion result required.
ADC1552_TYPE1_BLx	▪ Single conversion: Voltage In ▪ External trigger: Trigger In	
ADC1552_TYPE2_BLx	Single conversion: Voltage In	
AIO_TYPE1_ADC_BLx		
ADC_TYPE4_START_BLx	Obsolete	-
ADC1552_TYPE1_START_BLx		

D/A conversion

The following table shows comparable function blocks for replacing RTI blocks supporting D/A conversion.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
AIO_TYPE1_DAC_BLx	Voltage Out	Scaling of voltage range required.
DAC_TYPE3_Mx_Cy		
DAC1552_TYPE1_BLx		

Bit I/O

The following table shows comparable function blocks for replacing RTI blocks supporting bit I/O.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DIO_TYPE3_BIT_IN_BLx	Multi Bit In	-
DIO_TYPE3_BIT_IN_CH_BLx		
DIO_TYPE3_BIT_OUT_BLx	Multi Bit Out	-
DIO_TYPE3_BIT_OUT_CH_BLx		
DIO_TYPE4_BIT_IN_BLx	Multi Bit In	-
DIO_TYPE4_BIT_IN_CH_BLx		
DIO_TYPE4_BIT_OUT_BLx	Multi Bit Out	-
DIO_TYPE4_BIT_OUT_CH_BLx		
DIO1552_TP1_BIT_IN_BLx	Multi Bit In	-
DIO1552_TP1_BIT_IN_CH_BLx		
DIO1552_TP1_BIT_OUT_BLx	Multi Bit Out	-
DIO1552_TP1_BIT_OUT_CH_BLx		

Timing I/O

The following table shows comparable function blocks for replacing RTI blocks supporting timing I/O.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DIO_TYPE3_PWM_BLx	PWM/PFM Out	Scaling of duty cycle required.
DIO_TYPE3_FREQ_BLx		
DIO_TYPE3_PWM2D_BLx	PWM/PFM In	Scaling of duty cycle required.
DIO_TYPE3_F2D_BLx		
DIO_TYPE3_PW2D_BLx	Digital Pulse In	-
DIO_TYPE3_MC_PWM_BLx	Multi-Channel PWM Out	Scaling of duty cycle required.
	Trigger pulses: Digital Pulse Out	-

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DIO_TYPE3_ENC_BLx	Digital Incremental Encoder In	-
DIO_TYPE3_ENC_POS_SET_BLx		
DIO_TYPE4_PWM_BLx	PWM/PFM Out	Scaling of duty cycle required.
DIO_TYPE4_FREQ_BLx		
DIO_TYPE4_PWM2D_BLx	PWM/PFM In	Scaling of duty cycle required.
DIO_TYPE4_F2D_BLx		
DIO_TYPE4_PW2D_BLx	Digital Pulse In	-
DIO_TYPE4_MC_PWM_BLx	Multi-Channel PWM Out	Scaling of duty cycle required.
	Trigger pulses: Digital Pulse Out	-
DIO_TYPE4_ENC_BLx	Digital Incremental Encoder In	-
DIO_TYPE4_ENC_POS_SET_BLx		
DIO1552_TYPE1_PWM_BLx	PWM/PFM Out	Scaling of duty cycle required.
DIO1552_TYPE1_FREQ_BLx		
DIO1552_TYPE1_PWM2D_BLx	PWM/PFM In	Scaling of duty cycle required.
DIO1552_TYPE1_F2D_BLx		

Onboard sensor support

The following table shows comparable function blocks for replacing RTI blocks supporting the onboard sensors of the DS1401 Base Board.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DS1401_PRESSURE_BLx	Atmospheric Pressure In	Scaling of pressure values required
DS1401_ACCEL_READ_BLx	Acceleration In	Scaling of acceleration values required

Ethernet communication

The following table shows comparable function blocks for replacing the RTI Ethernet (UDP) Blockset.

Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
RTI Ethernet (UDP) Blockset	Ethernet Setup	-
	UDP Transmit	
	UDP Receive	

CAN communication

The following table shows comparable function blocks for replacing the RTI CAN blocksets.

Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
RTI CAN Blockset	CAN	The **CAN** function block is one part of implementing CAN communication in real-time applications. The CAN communication itself must be modeled with the Bus Manager in ConfigurationDesk. Refer to Overview of the Bus Manager (ConfigurationDesk Bus Manager Implementation Guide 🕮).
RTI CAN MultiMessage Blockset		

LIN communication

The following table shows a comparable function block for replacing the RTI LIN MultiMessage Blockset.

Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
RTI LIN MultiMessage Blockset	LIN	The **LIN** function block is one part of implementing LIN communication in real-time applications. The LIN communication itself must be modeled with the Bus Manager in ConfigurationDesk. Refer to Overview of the Bus Manager (ConfigurationDesk Bus Manager Implementation Guide 🕮).

FlexRay communication

The following table shows a comparable function block to implement FlexRay communication.

Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
RTI FlexRay Configuration Blockset	FlexRay	The **FlexRay** function block type is one part of implementing FlexRay communication in real-time applications. It lets you specify the hardware access for FlexRay communication and control the communication of the FlexRay network separately for each FlexRay

Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
		controller and FlexRay channel (A and/or B). The FlexRay communication itself must be modeled and supplied via the dSPACE FlexRay Configuration Package (refer to Modeling a FlexRay Bus Interface (Model Interface Package for Simulink - Modeling Guide 🕮)).

Serial communication

The following table shows comparable function blocks for replacing RTI blocks supporting serial communication.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
CAN_TYPE1_SER_STAT_Mx_Cy	Supported only by a custom function block. Refer to Implementing UART Serial Communication in ConfigurationDesk (ConfigurationDesk UART Implementation 🕮).	-
CAN_TYPE1_SER_TX_Mx_Cy		
CAN_TYPE1_SER_RX_Mx_Cy		
CAN_TYPE1_SER_SETUP_Mx_Cy	Obsolete	-

SENT communication

The following table shows comparable function blocks for replacing RTI blocks supporting SENT communication.

RTI Block of the Real-Time Interface Blockset	Comparable Function Block of ConfigurationDesk	Notes
DIO_TYPE3_SENT_RX_BLx	SENT In	-
DIO_TYPE4_SENT_RX_BLx		

SPI communication

The following table shows comparable function blocks for replacing RTI blocks supporting SPI communication.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DIO_TYPE3_SPI_RX_BLx	SPI Master	-
DIO_TYPE3_SPI_TX_BLx		
DIO_TYPE4_SPI_RX_BLx		
DIO_TYPE4_SPI_TX_BLx		
DIO_TYPE3_SPI_SETUP_BLx		
DIO_TYPE3_SPI_CYCLE_SETUP_BLx		
DIO_TYPE4_SPI_SETUP_BLx		
DIO_TYPE4_SPI_CYCLE_SETUP_BLx		

Interrupt handling

The following table shows how interrupts are replaced with I/O events in ConfigurationDesk.

Blocks of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DS1401BASE_HWINT	In ConfigurationDesk, the function blocks can generate I/O events that can be used to trigger asynchronous tasks, for example, the **Voltage In** function block. For more information, refer to Modeling Asynchronous Tasks (ConfigurationDesk Real-Time Implementation Guide 🕮).	-
ADC_TYPE4_HWINT		
ADC1552_TP1_HWINT_BLx		
CAN_TYPE1_SER_INT_Mx_Cy_Iz		
CAN_TYPE1_SER_INT_REC_LEV_Mx_Cy		
DIO_TYPE3_HWINT		
DIO_TYPE4_HWINT		
DIO1552_TP1_HWINT_BLx		

Power hold control

The following table shows comparable function blocks for replacing RTI blocks supporting the power hold functionality.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DS1401_POWER_DOWN	System Shutdown	-
DS1401_REMOTE_IN	Power On Signal In	

ECU interfacing

The **ECU Interface Configuration** function block is one part of implementing ECU interfacing in real-time applications. The ECU interface itself must be modeled with the ECU Interface Manager. Refer to Implementing the Real-Time Application with ConfigurationDesk (ECU Interfacing Overview 🕮).

Nonvolatile data handling

The following table shows comparable function blocks for replacing RTI blocks supporting nonvolatile data handling.

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
DS1401_RAM_WRITE	Not supported	Replaced by **Non-Volatile Memory Access** function block.
DS1401_RAM_READ	Not supported	
DS1401_NV_RAM_WRITE_BLx	Non-Volatile Memory Access	-
DS1401_NV_RAM_READ_BLx		
FLASH_SETUP	Not supported	Replaced by **Non-Volatile Memory**
STORE_TO_FLASH_BLx	Not supported	

RTI Block of the Real-Time Interface Blockset	Comparable Function Blocks of ConfigurationDesk	Notes
RESTORE_FROM_FLASH_BLx	Not supported	Access function block.
FLIGHT_REC_BLx	Not supported	Replaced by ControlDesk Data Logging. Refer to General Information on Data Logging (ControlDesk Measurement and Recording 🕮).

TRC exclusion

Instead of the RTI TRC Exclusion block, which excludes all blocks in a subsystem from the generated variable description file (TRC file), you must use subsystem omission tags (`DsVdOmit`). These tags let you reduce the content of the generated TRC file even more specifically, for example, by excluding variables. Refer to Adapting the Generation of the Variable Description File (Model Interface Package for Simulink - Modeling Guide 🕮).

Related topics

References

Overview of MicroAutoBox III I/O Functionality (MicroAutoBox III Hardware Installation and Configuration 🕮)

More Information on Using the MicroAutoBox III

Documentation Overview

Introduction

dSPACE products support the MicroAutoBox III in different use cases. The overview shows the documentation for installing and configuring the hardware, implementing the real-time application, experimenting, and testing.

Installing and configuring the hardware

The following table lists the documentation for installing and configuring the MicroAutoBox III, building the cable harness, and conditioning I/O signals.

Product	Product Description	Document
MicroAutoBox III	MicroAutoBox III is intended to be used for developing, researching, and testing functions for electronic control units (ECU).	MicroAutoBox III Hardware Installation and Configuration 🕮 Shows you the installation and hardware configuration for operating a MicroAutoBox III. It provides details on the the hardware and gives information on the cable harness for connecting external devices.
RapidPro	The RapidPro system can expand a MicroAutoBox III with solutions for signal conditioning and power stages. The MicroAutoBox III does not support a RapidPro Control Unit as I/O subsystem.	RapidPro System Hardware Installation Guide 🕮 Provides all instructions on installing and connecting the hardware components of the RapidPro system.

Implementing the real-time application

The following table lists the documentation for modeling and implementing the real-time application running on the MicroAutoBox III.

Product	Product Description	Document
Model Interface Package for Simulink	The Model Interface Package for Simulink lets you specify the interface of a behavior model for the simulation in ConfigurationDesk and VEOS Player.	Model Interface Package for Simulink - Modeling Guide 🕮 Shows you how to work with the Model Interface Package for Simulink.
ConfigurationDesk	ConfigurationDesk supports the implementation of real-time applications via a signal chain using graphical elements.	ConfigurationDesk Tutorial MicroAutoBox III 🕮 Uses the `CfgMicroAutoBoxIIITutorial` demo project to help you learn the basic steps in ConfigurationDesk when working with a MicroAutoBox III.
		ConfigurationDesk I/O Function Implementation Guide 🕮 Provides feature-oriented access to the information you need to work with function blocks of ConfigurationDesk.
		ConfigurationDesk Bus Manager Implementation Guide 🕮 Introduces you to the Bus Manager in ConfigurationDesk. It lets you configure bus communication and implement it in real-time applications.
RTI FPGA Programming Blockset	The RTI FPGA Programming Blockset is a Simulink blockset that lets you model an FPGA application for the DS1514 FPGA Base Board.	RTI FPGA Programming Blockset Guide 🕮 Provides basic information about the RTI FPGA Programming Blockset, including the entire software environment and the supported hardware. You will also learn how to apply the main features of the blockset.
ECU Interface Manager	The ECU Interface Manager lets you prepare and configure ECU applications for ECU interfacing. ECU interfacing comprises methods and tools for reading and/or writing individual variables of an ECU application for development and test purposes.	ECU Interfacing Overview 🕮 Provides an overview of ECU interfacing use cases, and the products involved in ECU interfacing. The document describes the entire workflow for ECU interfacing.

Experimenting with the MicroAutoBox III

The following table lists the documentation for controlling and parameterizing the real-time application and visualizing and managing the simulation results.

Product	Product Description	Document
ControlDesk	ControlDesk is a software tool for experimenting with a MicroAutoBox III. It can be used for downloading the real-time application, calibrating parameters, and measuring signals.	ControlDesk Introduction and Overview 🕮 Introduces you to ControlDesk.
Real-Time Testing	Using Real-Time Testing, you can execute scripts synchronously to the real-time application on the MicroAutoBox III.	Real-Time Testing Guide 🕮 Describes the features of Real-Time Testing. It gives information on the basics of Real-Time Testing and shows how you can implement it on the MicroAutoBox III.

Testing

The following table lists the documentation for automated testing.

Product	Product Description	Document
AutomationDesk	AutomationDesk is a software tool for creating and managing any kind of automation tasks. Within the dSPACE tool chain, it is mainly used for automating tests on dSPACE hardware.	AutomationDesk Introduction And Overview 🕮 Introduces you to AutomationDesk.
SYNECT	SYNECT is data management and collaboration software with a special focus on model-based development and ECU testing.	SYNECT Guide 🕮 Explains the basics concepts of SYNECT and provides instructions on getting started with SYNECT.

Related topics

Basics

MicroAutoBox III - Hardware and Software Overview