

**SIPLUS CMS**

SIPLUS CMS4000 ION SIMATIC TDC T001  
Manual

English

Release 2010-02

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## Safety Guidelines

This document contains notices which you should observe to ensure your own personal safety as well as to avoid property damage. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol.



### Danger

indicates an **imminently** hazardous situation which, if not avoided, will result in death or serious injury.



### Warning

indicates a **potentially** hazardous situation which, if not avoided, could result in death or serious injury.



### Caution

used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### Caution

used without safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

### Notice

used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesirable result or state.

When several danger levels apply, the notices of the highest level (lower number) are always displayed. If a notice refers to personal damages with the safety alert symbol, then another notice may be added warning of property damage.

### Qualified Personnel

The device/system may only be set up and operated in conjunction with this documentation. Only qualified personnel should be allowed to install and work on the equipment. Qualified persons are defined as persons who are authorized to commission, to earth, and to tag circuits, equipment and systems in accordance with established safety practices and standards.

### Intended Use

Please note the following:



### Warning

This device and its components may only be used for the applications described in the catalog or technical description, and only in connection with devices or components from other manufacturers approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up and installed correctly, and operated and maintained as recommended.

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### Disclaimer of Liability

We have checked the contents of this document for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in the manual are reviewed regularly, and any necessary corrections will be included in subsequent editions. Suggestions for improvement are welcomed.

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# 1 Preface

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## 1.1 Purpose of this Document

This document supports you when commissioning and using the software **SIPLUS CMS4000 ION SIMATIC TDC T001** of the SIPLUS CMS product line.

## 1.2 Basic Knowledge Required

In order to understand this manual, general knowledge of automation technology and software packages SIPLUS CMS4000 X-Tools, STEP 7, D7-SYS, S7-CFC is required.

In addition, you must be familiar with network technology (UDP/IP) and with using computers with MS Windows XP.

## 1.3 Validity of this Document

This document is valid for the following software:

- SIPLUS CMS4000 ION SIMATIC TDC T001, V 03.02

During the following pages, this software will be referred to by the term **ION SIMATIC TDC T001**

## 1.4 Terms

The following terms are used within this document:

Term	Description
CP	Communication Processor
ION	I/O-Node
UIK	Universal Identification Key

## 2 Scope of Delivery

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### 2.1 Scope of Delivery

#### What is shipped?

- CD  
SIPLUS CMS4000 ION SIMATIC TDC T001
- Certificate of License (CoL)
- Storage medium with License Key

### 2.2 Unpacking and Checking

After unpacking, please check

- the packet for completeness and
- all parts for transport damage.

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#### Caution

Do not use any parts that show evidence of damage!

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## 3 Product Characteristics

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### 3.1 Introduction

This chapter gives you an overview of the function of the component

- ION SIMATIC TDC T001

of the SIPLUS CMS4000 productline.

The **ION SIMATIC TDC T001** consists out of two function blocks which must be engineered into SIMATIC TDC controllers. After the engineering, the **ION SIMATIC TDC T001** is used for the communication with SIPLUS CMS4000 X-Tools (during the following pages referred as **X-Tools**) and for the transmission of measurement data to **X-Tools**.

The engineered **ION SIMATIC TDC T001** identifies itself to **X-Tools** as Ethernet device which communicates via TCP/IP. When the measurement data transmission is started through **X-Tools**, the **ION SIMATIC TDC T001** sends the requested values of the SIMATIC TDC to the used PC during each cycle.

### 3.2 Hard- and Software Requirements

#### 3.2.1 Hardware

- PC with Windows XP Professional (Service Pack 2 recommended)
  - CPU with  $\geq 2.4$  GHz
  - working memory  $\geq 512$  MByte
  - OpenGL enabled graphic controller (from 1024x768 Pixels, 1280x1024 Pixels or more recommended)
  - IEEE1394, Ethernet and USB interfaces
- SIMATIC TDC controller
  - CPU550 or CPU551
  - CP5100 or CP51M1
- Ethernet connecting cables

#### 3.2.2 Software

- SIPLUS CMS4000 X-Tools (Standard or Professional Edition)
- STEP7 (from V 5.x), CFC, D7-SYS

### 3.3 Order Numbers

Article	Order Number (MLFB)
SIPLUS CMS4000 ION SIMATIC TDC T001	6AT8000-0CA00-2XA0
SIPLUS CMS4000 X-Tools - Standard Edition	6AT8000-0AA00-1BA0
SIPLUS CMS4000 X-Tools - Professional Edition	6AT8000-0AA00-2BA0

Further information is obtained from your local Siemens office and from the homepage <http://www.siemens.com/siplus-cms>.

## 4 Installation

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### 4.1 Automation License Manager

To use ION SIMATIC TDC T001 software, you require a product-specific license key (user rights). Starting with X-Tools V 03.02, this key is installed with the Automation License Manger.

The Automation License Manger is a software product from Siemens AG. It is used to manage the license keys (license modules) for all systems.

The Automation License Manger is located on the installation device of X-Tools starting with V 03.02. Details about installation and handling you can take from X-Tools User Manual.

The license of ION SIMATIC TDC T001 is a floating license which is valid for an unlimited amount of time. For each started Device Profile (for each active ION SIMATIC TDC T001) a license key is required by X-Tools. The key is acquired during runtime and released when the Device Profile is stopped. More information for license management and handling of license key you can take from X-Tools User Manual

### 4.2 Installation of Library ION SIMATIC TDC T001

1. Insert the product-CD **ION SIMATIC TDC T001** into the drive of your PC.
2. Copy the library files **FBACAS.A** and **FBACAS.MSK** into your D7-SYS library directory (**..\Siemens\Step7\S7cfc\sdblocks**).
3. After the installation was completed successfully, the actual engineering can be started.

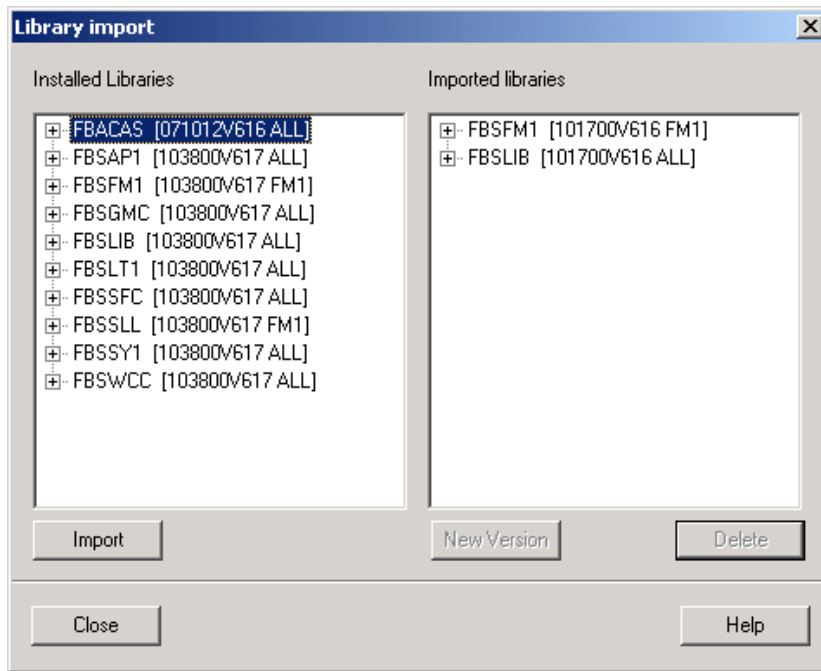


## 5 Software Engineering

### 5.1 Inserting the Function Blocks

#### Opening the Library

1. Within **CFC**, open via **Options** → **Block Types** the list of present libraries and import the library **FBACAS** into your project.

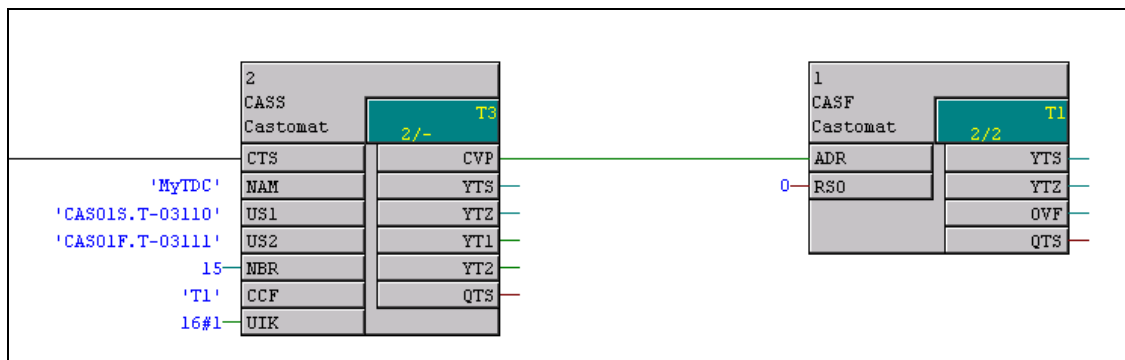


opening of the library

2. Close the dialog with **Close**.

#### Inserting the Function Blocks

1. Configure the measurement block **CASF** in T1 (the fastest possible measurement cycle) and configure the management block **CASS** in a cycle, which is 8...16 times smaller than T1. Bigger cycle time differences result in bigger data channels which are used by the blocks.
2. Connect the output **CVP** of the **CASS** management block with the input **ADR** of the **CASF** measurement block. Consider the instructions in the chapter “Block Description” during engineering the block.



connecting of the two function blocks

3. In case multiple **ION SIMATIC TDC T001** function blocks shall be used within one CP (e.g. multiple CPUs per CP), each engineered **ION SIMATIC TDC T001** must get unique channel and port numbers. This is needed because **X-Tools** must be able to access each of the present **ION SIMATIC TDC T001** devices independently.
  4. Finally, the software must be compiled and loaded into the target device. After the reset, the engineered **ION SIMATIC TDC T001** function blocks are ready for operation.
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**Note**

The measurement cycle can be increased by **X-Tools**. For best results it should be the same as the cycle time of **CASF**.

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## 6 Block Description

### 6.1 CASF (SIPLUS CMS4000 Fast)

#### 6.1.1 Functionality

The “fast” function block **CASF** records the selected measurement values during each cycle and stores them into the ring buffer. As the complete communication is performed via **CASS**, the processor is used only very lightly within the time slice which has been chosen for **CASF**.

#### 6.1.2 Symbol

<b>CASF</b>		
address of the common memory	DW ADR	ST I block status
reset overflow	B0 RSO	YTS I state indicator
		YTZ I addition to <b>YTS</b>
		LFZ I last error
		OVF DI overflow
		QTS BO operating state
		CL I calculated channel length

symbol of **CASF**

#### 6.1.3 Inputs

Input	Description	Default Value
<b>ADR</b>	Contains the address of the common memory, which is received from <b>CASS</b> .	16#0
<b>RSO</b>	Must be 1 in order to reset the overflow counter <b>OVF</b> , else 0.	95.0

inputs of **CASF**

### 6.1.4 Outputs

Output	Description
<b>ST</b>	Returns the internal status.
<b>YTS</b>	Returns an identifier for the diagnosis in case of an error.
<b>YTZ</b>	Returns additional information in case <b>YTS</b> is not zero.
<b>LFZ</b>	Returns the last occurred error status. Contrary to <b>YTS</b> , <b>LFZ</b> is never deleted.
<b>OVF</b>	Returns how often the block could not write data into the internal ring buffer since the last reset, i.e. how often an overflow occurred.
<b>QTS</b>	Returns the operating state.
<b>CL</b>	Returns the length of the created data channel.

outputs of **CASF**

### 6.1.5 Status

The following status information can be read out from **YTS** and **YTZ**:

YTS	YTZ	Description
0	-	No error.
1	ST	Error during the general memory allocation, operating system status at <b>YTZ</b> .
2	ST	Error during the reading of the own cycle time, operating system status at <b>YTZ</b> .
3	-	Error during the reading of the address of <b>CASS</b> .

status information of **CASF**

### 6.1.6 Technical Data

<b>Loadable online</b>	No
<b>Can be engineered in</b>	Alarm tasks, cyclic tasks
<b>Calculated in</b>	Initmode, Normalmode

technical data of **CASF**

## 6.2 CASS (SIPLUS CMS4000 Slow)

### 6.2.1 Functionality

The “slow” function block **CASS** is used for processing of the following tasks:

- Basic configuration of the SIPLUS CMS4000 specific parameters.
- Communication with **X-Tools** via the chosen CP and TCP/IP.
- Transmission of the current address book to **X-Tools** on request.
- Transmission of current status information to **X-Tools** on request.
- Receiving of the measurement values which are chosen by the user from **X-Tools** as well as preparation of the specified measurement values for **CASF**.
- Transmission of the measurement values, which are recorded by **CASF**, to **X-Tools**.

### 6.2.2 Communication

The **CASS** function block creates two channels for the communication with **X-Tools**. Both channels wait for a connection attempt from outside, i.e. an arbitrary PC with **X-Tools** can connect to an engineered **ION SIMATIC TDC T001** without the need to engineer the IP address before.

### 6.2.3 Buffer Sizes

Out of the desired number of measurement values which shall be recorded (input **NBR**) and the cycle time factor between **CASF** and **CASS**, the **CASS** automatically calculates the needed buffer (output **UDW**) and channel sizes (output **CL**). The determined values are displayed at the outputs and transmitted to **X-Tools**.

The calculation of the buffer and channel sizes is based on 32 bit (= 4 byte) data types (e.g. float). In case smaller data types (e.g. byte, short, ...) are transmitted, more than the specified number of measurement values can be stored and transmitted within the same buffer size of course.

## 6.2.4 Packetizing

The packetizing is performed based on the number of measurement values which shall be recorded and the cycle time factor between **CASF** and **CASS**.

Example: **CASF** runs in a time slice of 1ms, **CASS** in a time slice of 8 ms. It shall be possible to record up to 50 32 bit (= 4 byte) measurement values.

Out of this we can calculate a channel size of  $50 * 4 = 200$  byte as well as a puffer size of  $200 * 8 = 1600$  byte. The actual channel and buffer size is chosen a little bit bigger because of the telegram header and a security buffer.

A maximum of up to 250 measurement values can be recorded. The maximum data volume per cycle and **ION** is 512 Byte. In addition, the buffer size must not exceed 9000 bytes. Both maximal values are checked during the engineering. In addition, the user has to ensure not to stress the CPU and the Ethernet-CP too much through the engineered project.

### Note

Because of the maximal Ethernet packet length of 1492, an optimal transmission is achieved when the calculated buffer sizes stays below this value.

## 6.2.5 Symbol

		<b>CASS</b>		
module and interface	GV CTS	CVP DW		address of the common memory
Device Name	S NAM	ST I		block status
send/receive channel (commands)	S US1	YTS I		state indicator
send/receive channel (data)	S US2	YTZ I		addition to <b>YTS</b>
number of recordable measurement values	I NBR	YT1 W		status command receive channel
<b>CASF</b> cycle time	S CCF	YT2 W		status data transmit channel
ID (0..7)	W UIK	QTS BO		operating state
device name	W MAC	CL I		calculated channel length

symbol of **CASS**

## 6.2.6 UIK

The UIK is a identifier for each **ION** and has to be unique in a system. For Ethernet-IONs it consists of the MAC-address of the **SIMATIC TDC CP** and a 4 byte prefix. If there are more than one **ION SIMATIC TDC T001** in a control (with the same IP-address) this prefix is used for unique identification of each **ION**. These 4 byte need to be given in configuration (UIK).

The MAC-address is read automatically by the **ION**. If the control can not read the MAC-address 0x08000696 is set as default (for **SIMATIC TDC CPs**). The last 4 byte can be configured by user in this case (MAC). If the MAC-address can be read user input (MAC) is ignored.

### 6.2.7 Inputs

Inputs	Description	Default Value
<b>CTS</b>	Contains the name of the used Ethernet-CP.	<i>none</i>
<b>NAM</b>	Contains the Device Name.	<i>none</i>
<b>US1</b>	Contains the name and port number of the command channel, which is used for the communication with <b>X-Tools</b> . The name is arbitrary but must be unique at the used CP. The port number also must be unique at the used CP.	CASS.T-01234
<b>US2</b>	Contains the name and port number of the data channel, which is used for the communication with <b>X-Tools</b> . The name is arbitrary but must be unique at the used CP. The port number also must be unique at the used CP.	CASF.T-01235
<b>NBR</b>	Contains the maximal number of recordable 32 bit (=4 byte) measurement values, where no value bigger than 250 can be entered. The maximal number of recordable measurement values influences the calculation of the needed channel and buffer lengths.	64
<b>CCF</b>	Contains the sample time (T1 ... T5) in which the function block <b>CASF</b> is running.	T1
<b>UIK</b>	Contains the first 4 byte of the UIK of the engineered <b>ION SIMATIC TDC T001</b> . The UIK (UIK-input + MAC-address) must be unique in the system.	0x0000
<b>MAC</b>	Contains the last 4 byte of the UIK of the engineered <b>ION SIMATIC TDC T001</b> . The UIK (UIK-input + MAC-address) must be unique in the system.	0x0000

inputs of **CASS**

### 6.2.8 Outputs

Output	Description
<b>CVP</b>	Returns the address of the common memory, which is transmitted to <b>CASF</b> .
<b>ST</b>	Returns the internal status.
<b>YTS</b>	Returns an identifier for the diagnosis in case of an error.
<b>YTZ</b>	Returns additional information in case <b>YTS</b> is not zero.
<b>YT1</b>	Returns the cyclic status of the command channel.
<b>YT2</b>	Returns the cyclic status of the data channel.
<b>QTS</b>	Returns the operating state.
<b>CL</b>	Returns the length of the created data channel.

outputs of **CASS**

## 6.2.9 Status

The following status information can be read out from **YTS** and **YTZ**:

YTS	YTZ	Description
0	-	No error.
1	ST	Error during the general memory allocation, operation system status at <b>YTZ</b> .
2	ST	Error during the memory allocation for the communication buffer, operating system status at <b>YTZ</b> .
3	ST	Error during the memory allocation for the ring buffer, operating system status at <b>YTZ</b> .
4	ST	Error during the reading of the own cycle time, operating system status at <b>YTZ</b> .
5	ST	Error during the creation of the send channel, operating system status at <b>YTZ</b> .
6	ST	Error during the creation of the receive channel, operating system status at <b>YTZ</b> .
7	ST	No or wrong answer from <b>CASF</b> .
8	-	Cycle time of <b>CASF</b> is slower than cycle time of <b>CASS</b> .
9	ST	Permanent channel error, operating system status at <b>YTZ</b> .
10	ST	Temporary channel error, operating system status at <b>YTZ</b> .
15	-	An acknowledge could not be sent in time.
16	-	<b>NBR</b> is wrong, only 1 ... 250 is allowed.
17	-	The calculated channel length is too big (the maximal value is 9000 bytes).
20	-	Error during the reading of the own rack name.
21	-	Error during the reading of the own processor number.
22	-	<b>CCF</b> is wrong, only T1 ... T5 is allowed.

status information of **CASS**

## 6.2.10 Communication State

A detailed description of values of YT1 and YT2 can be found in D7-SYS online help. (Press F1 key in CFC and look for topic "help on errors".)

## 6.2.11 Technical Data

Loadable online	No
Can be engineered in	Alarm tasks, cyclic tasks
Calculated in	Initmode, Normalmode

technical data of **CASS**

## 6.2.12 TSAFE

Some special data (description and location) of the **ION SIMATIC TDC T001** are stored in TSAFE area. For every engineered **ION SIMATIC TDC T001** there have to be reserved 2 times 256 byte.

The TSAFE area can be deleted during download of the project. The default configuration will be restored in this case.



## 7 References

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### 7.1 Other Documentation

- <http://www.siemens.com/siplus-cms>

## 8 Contact Information

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### Address

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