BECKHOFF New Automation Technology

Manual | EN ADS Monitor



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1 Foreword

1.1 Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with applicable national standards.

It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the components.

It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations! Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

▲ DANGER

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

A WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE

Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.



Tip or pointer

This symbol indicates information that contributes to better understanding.

1.3 Notes on information security

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To stay informed about information security for Beckhoff products, subscribe to the RSS feed at <u>https://www.beckhoff.com/secinfo</u>.

2 Overview

The TwinCAT ADS Monitor is divided into the two applications AMS logger (TcAmsLog.exe) and AMS viewer (TcAmsAdsViewer.exe). The logger is responsible for recording the AMS commands and the AMS/ADS viewer for displaying this data. Furthermore, the logger can be controlled remotely by the viewer via TCP/IP. The following diagram shows the relationship between the individual components.



3 AMS Logger

The AMS logger (TcAmsLog.exe) is responsible for recording AMS messages. The logger is configured with the help of an XML file, that can be loaded with **Load Configuration**. Among other things one can specify the maximal size of the file and if a ring buffer should be used. After starting the application an attempt is made to load a configuration file named TcAmsLogger.xml from the executable path.

Ams Logger	
Logger Configuration Current Configuration File: C:\TwinCAT\TcAmsLogger\Logger\NT\TcAmsLogger.xml	Start
Load Configuration	
Capture Info Number Of Frames: 0 File Size (Byte): 0	

As soon as **Start** is clicked, the logger starts to record the AMS messages. The capture process can be stopped with the **Stop** button. By default, the captured AMS commands are saved in the file ... \TwinCAT\Boot\Current.cap. The name of this file can be changed in the XML configuration file. But it is not possible to change the path. The AMS/ADSViewer can load and analyze the AMS commands stored in this file.

Following tags can be use in the XML configuration file:

Tags	Description	Default
<filesize></filesize>	Max size of the capture file.	1MB
<autosave></autosave>	If <autosave> is false, the AMS messages are stored in a temporary file. After the capture is stopped the file is deleted. This configuration only makes sense if the logger is controlled remotely by the viewer.</autosave>	true
	If <autosave> is true, the messages are stored in the TwinCAT Boot folder. The name of this file can be set with the Tag <autosavename></autosavename></autosave>	
<autosavename></autosavename>	Name of the capture file.	Current.cap
<ringbuffer></ringbuffer>	Specifies the behavior when the maximal file size (set with <filesize>) is reached. If this value is set to false, the capture process is stopped. Otherwise a ring buffer is used. Here the captured messages are stored in two or more files. If all files are full, the oldest file is overwritten. The number of files can be set with <ringbufferfiles>.</ringbufferfiles></filesize>	true
	The size of one file is the maximum file size(<filesize>) divided by the number of files (<ringbufferfiles>).</ringbufferfiles></filesize>	
<ringbufferfiles></ringbufferfiles>	Number of files used for the ring buffer (see <ringbuffer>)</ringbuffer>	2
<overwriteexisting></overwriteexisting>	If <overwriteexisting> is true, an existing capture file is overwritten. Otherwise, the new messages are appended to the existing file.</overwriteexisting>	true

Controlling the logger remotely with the AMS/ADS Viewer

It is also possible to control the logger remotely with the AMS/ADS Viewer. As soon as the Logger application is executed, the logger waits for a connection attempt from the viewer. In this case the text **Viewer Connected** is displayed in the bottom area of the logger window. Now the viewer can start, stop, and configure the logger.

4 AMS/ADS Viewer

The TwinCAT AMS/ADS viewer(TcAmsAdsViewer.exe) is responsible for displaying capture file(offline mode) recorded by the TwinCAT AMS logger and for controlling the AMS logger remotely. In the offline mode(no connection to the logger) the capture AMS commands can be loaded and analyzed.

4.1 Loading and analyzing capture files (offline mode)

If the viewer is not connected to the logger, one can load the AMS commands captured by the AMS logger. The display is divided into three windows. The upper window is a list view containing all recorded commands. The parser view in the middle provides additional information about the command selected in the tree view. The bottom view displays a hex dump of the selected command.

📕 Untitled - AmsAdsViewer								
<u>File E</u> dit <u>V</u> iew <u>C</u> onnec	tion <u>A</u> nalyze	Help						
	8 6 ?	■ > E>						
AmsViewer	No.	TimeStamp	CmdId	Sender	Target	Error	hUser cbData	
TCATAdsTest	9110 06	5.02.2004 11:20:00 530 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	1.8
	9111 06	5.02.2004 11:20:00 579 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0×F0010003 26	
	9112 06	0.02.2004 11:20:00 580 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0xF0010003 4	
	9113 06	02.2004 11:20:00 629 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0xF0010003_26	
	9114 06	5.02.2004 11:20:00 630 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	
	9115 06	5.02.2004 11:20:00 679 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0×F0010003 26	
	9116 06	5.02.2004 11:20:00 680 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	
	9117 06	5.02.2004 11:20:00 729 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0×F0010003 26	
	9118 06	6.02.2004 11:20:00 730 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	
	9119 06	5.02.2004 11:20:00 779 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0×F0010003 26	
	9120 06	0.02.2004 11:20:00 780 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	
	9121 06	02.2004 11:20:00 829 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	0	0×F0010003 26	
	9122 06	02,2004 11:20:00 830 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	0	0×F0010003 4	
	9123 06	02.2004 11:20:00 879 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	U	0×F0010003-26	
	9124 06	0.02.2004 11:20:00 880 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	U	0×F0010003 4	
	9125 06	02.2004 11:20:00 929 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	U	0xF0010003 26	
	9126 06	0.02.2004 11:20:00 930 ms	W Res	172.16.5.104.1.1 (10201)	172.16.5.104.1.1 (811)	U	0×F0010003 4	eme
	9127 06	02.2004 11:20:00 979 ms	W Req	172.16.5.104.1.1 (811)	172.16.5.104.1.1 (10201)	U	0XF0010003 26	Y
		IT AND TO AND THE	Wr Dar	177 16 5 104 1 1 100 2001	077165 114 1 1 18111	. Carlo and a second		Ri I
		e Dequect						2".
		Heador						20001
			33					
	<u><u> </u></u>	letta 172.16.5.104.1.1, Port o	511					
	E N	letId 172.16.5.104.1.1, Port 1	10201					
		$mdId = 3 (0 \times 3)$						
	😥 S	tateFlags Summary = $4(0 \times 4)$						
	- C	bData = 26 (0×1a)						
	E	rrorCode = 0 (0x0) NO ERROI	R					
	II	nvokeId = -268369917 (0xf00	10003)					×
	00000000	AC 10 05 68 <u>01 0</u>	1 D9 27	AC 10 05 68 01 01 2B	03hÙ'h+			
	00000010	03 00 04 00 14 0	0 00 00	10 00 00 00 03 00 01	FO	3		
	00000020	03 00 00 80 02 0		NE 00 00 00 43 40 49	45 I CTT	- F		
	00000020	4F E4 21 2D 22 2	0 00 00 0	DE 00 00 00 40 40 40 47	NT1_2011E			
	00000030	4E 54 31 2D 32 3	0 31 31	55 00	M11-20115.			
	<u>)</u>						1	-
Ready							a l'anne ann an l'anne a	1.11

Save a capture file

To save a capture file, one must right click the entry **AmsViewer** in the tree view. Then select **Save Capture As...** in the opened context menu. This opens the **Save As** Dialog:

Save As					? 🔀
Save jn:	😂 TwinCAT		💌 O 🦻	• 🔝 💙	
My Recent Documents Desktop My Documents	ADS Api Boot CNC Driver EventLogger InfoSystem Io IO Api Plc Resource Samples Scope TcAmsLogger TcAmsLogger CpIpServer	 cur2-2.cap cur2.cap cur3.cap Current.cap Fror.cap Filtered2.cap Filtered3.cap Filtered.cap 			
My Network	File <u>n</u> ame: Save as <u>t</u> ype:	Capture Files (*.cap)		✓✓	<u>S</u> ave Cancel
	Range Fro <u>m</u> 1	T <u>o</u> 9148	<u> </u>		.:

The textboxes **Range From** and **Range To** are used to specify the range that should be saved. If the **Filtered** check box is checked, only the filtered AMS commands are saved. This is extremely useful for minimizing the size of large capture files.

Filter a capture file

In offline mode one can filter the capture AMS/ADS commands. There are more much filter possibilities available than there are for capturing the AMS/ADS commands. To enter a new filter, one has to right click on the entry **AmsViewer** in the tree view. In the opened context menu select **Set Display Filter...** This opens following dialog:

Set Filte	ſ	
◯ Displa ⊙ Set Fil	y all AmsAdsCommands Iter	OK Cancel
Filter:	TargetNetId == 172.16.17.60.1.1 AND TargetPort == 801 Add Expression Operator	

In the text box **Filter** the filter string can be entered. Expressions can be combined with Boolean operators (AND, OR, NOT) here. An expression is a combination of a property (e.g. TargetNetId) a relation (! =,==,<,>,=,<) and a value (number, NetId etc.) or a property on its own. If a property is used as expression, the program checks if the property exists AMS command.

Ads_IndexGroup

If this filter string is entered, all commands are displayed, that contain this property. In this case all ADS Write, Read, ReadWrite and AddDeviceNotification requests would be displayed.

Ads_IndexGroup == 0x4020

If you enter this string, all ADS Write, Read, ReadWrite and AddDeviceNotification requests with an IndexGroup of 0x4020 would be displayed. There are also properties, that cannot be combined with a relation.

AdsCmd

For instance this filter string displays all ADS commands. The properties starting with Ads_ are ADS specific properties.

Property	Description	Example
SenderPort	Port of the sending ADS device.	SenderPort > 800
SenderNetId	AMS-NetId of the sending ADS device.	SenderNetId == 172.16.17.5.1.1
TargetPort	Port of the target ADS device.	TargetPort == 123
TargetNetId	AMS-NetId of the target ADS device.	TargetNetId != 127.12.2.3.1.1
ErrorCode	AMS error code. 0, if no error occurred.	ErrorCode > 0
CmdId	Id of the AMS command.	
hUser	User handle	hUser == 0x12345678
cbData	Length of the data in byte.	cbData > 40
StateFlags	AMS state flags.	
Response	Is true, if the command is a response.	Response
Data	Data of the AMS command	Data == 'MAIN.Variables[10]'
AdsCmd	Is true, if the command is a ADS request or response.	AdsCmd
Ads_Read	Is true, if the command is a ADS read request or response.	Ads_Read
Ads_Write	Is true, if the command is a ADS write request or response.	Ads_Write
Ads_ReadWrite	Is true, if the command is a ADS ReadWrite request or response.	Ads_ReadWrite
Ads_ReadDevice Info	Is true, if the command is a ADS ReadDeviceInfo request or response.	Ads_ReadDeviceInfo
Ads_ReadState	Is true, if the command is a ADS ReadState request or response.	Ads_ReadState
Ads_WriteCtrl	Is true, if the command is a ADS WriteCtrl request or response.	Ads_WriteCtrl
Ads_AddDevice Note	Is true, if the command is a ADS AddDeviceNote request or response.	Ads_AddDeviceNote
Ads_DelDeviceN ote	Is true, if the command is a ADS DelDeviceNote request or response.	Ads_DelDeviceNote
Ads_DeviceNote	Is true, if the command is a ADS DeviceNote request or response.	Ads_DeviceNote
Ads_IndexOffset	Index-Offset of the ADS command	Ads_IndexOffset
Ads_IndexGroup	Index-Group of the ADS command.	Ads_IndexGroup
Ads_Result	Result of the command. A value not equal to 0, indicates an error.	Ads_Result
Ads_data	Data of the ADS command	Ads_data

Following table list the supported properties:

To make the entry of expressions easier the **Filter Expression** Dialog can be opened with **Add Expression** In the left list box, all supported properties are listed. If a property is selected, the **Relation** list box displays all possible relations. The value of the property can be entered in the textbox **Value**.

Relation:	Value:
= = > < > < > = 	
	Relation: is present != > < < =

If the dialog is confirmed with **OK**, the expression is added to the **Filter** text box.

Example 1:

Display all AMS commands sent or received from an ADS device with the AMS-NetId 172.16.7.70.1.1:

sendernetid == 172.16.7.70.1.1 OR targetnetid == 172.16.7.70.1.1

Next we want reduce this set to all ADS write commands:

(sendernetid == 172.16.7.70.1.1 OR targetnetid == 172.16.7.70.1.1) AND ads_write

Example 2:

Find the string 'MAIN.Values' in the ADS data:

ads_data contains 'MAIN.Values'

Example 3:

Find the byte pattern '01 25 a0':

ads_data contains '01 25 a0'

4.2 Remote control of the logger (online mode)

The Viewer can control the AMS Logger remotely. As s consequence the logger can be started, stopped, and configured from a remote computer.

Connect to the AMS logger

1. Open the menu Connection and select the entry Connect. This opens the Connect dialog:

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Connect			2
AmsNetId:	172.16.5.104.1.1 (local)	~ (OK
		[Cancel

2. Choose the computer that contains the AMS Logger you want to connect to and confirm the dialog.

Applying a filter in online mode

In the online mode you can set a filter, to reduce the amount of AMS/ADS commands to be recorded. Therefore you have to select the entry **Set Capture Filter...** in the context menu of the tree view item **AmsViewer**. This opens the **Set Filter** dialog:

Set Filter	
🔘 Display all AmsAdsCommar	ıds
💽 Set Filter	
Included Addresses	Set
Excluded Addresses	Set
ADS Messages	
Response with Error	
	OK Cancel

If the **ADS Message** button is checked, only ADS commands are captured. If the **Response with Error** button is checked, only the erroneous AMS/ADS commands are captured.

If the **Included Addresse**s button is checked, you can specify a list of ADS devices, whose messages you want to record.

Address Filter		×
NetId 172.16.4.203.1.1	Port 27000	OK Cancel
		Select Addresses AmsNetId: 172.16.4.203.1.1 (local) Port:
Add	Remove	Any AmsNetId Any Port
		OK Cancel

With **Excluded Addresses** you can specify a list of ADS devices, whose messages you do not want to record.

Starting/Stopping the capture



The capture can be started with the **<F5>** key or with the displayed button in the toolbar.



The capture can be stopped with the shortcut **<Shift>** + **<F5>** or by clicking the display button in the toolbar. To view the captured AMS/ADS message, you have to select the entry **Display Captured Packets...**in the context menu of the tree view item **AmsViewer.**

4.3 Create Test signals

The ADS test monitor enables configuration of test signals for testing the functionality of the ADS server.

Establishing a connection to the ADS server

Select TCATAdsTest in the main window to specify the Ams Net Id and the configured Ams port.

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😫 Untitled - AmsAdsVie		
File Edit View Canture	> Display Connection Analyze Help	
File Edit View Capture		
	Ads Timeout: 5000	
Ready		

Via an existing connection configurable signals can be sent to the ADS server.

4.3.1 Read command

Right-click on **TCATAdsTest** to generate a test signal via the **Append Command...** context dialog.

😕 Untitled - AmsAdsViewer	JN
File Edit View Capture Display Connection Analyze Help	
AmsViewer CATAdsTest Append Command Append TCATAdsTest Delete TCATAdsTest 2.16.4.203.1.1 Ams Port: 2700 Ads Timeout: 5000	
Ready	

Creating test signals

A dialog for configuring the signal opens:

Append Comm	and	×
Name:	ExReadReq	OK Cancel
Comment:		
Command:	Extended Read Request	

Assign a name, select the command Extended Read Request and confirm the entry with OK.

Example configuration for an extended read command

In main window specify the Index Group and the Index Offset for the ADS server:

🟓 Untitled - AmsA	ds¥iewer					_ 🗆 ×
File Edit View Ca	pture Display Connect	ion Analyze	e Help			
	h C 6 ? -					
⊶ AmsViewer ⊡ TCATAdsTest ExReadReg	Extended Read Reque	ec		Returned Bytes: Error Code:	0	Transfer
	Itype Insert Item Append Ite Edit Item Delete Iten	m m im	Jata			
Ready						

The data to be read can be added the context menu Append Item (right-click).

In the following dialog the Type of the read value can be entered:

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Edit Item		×
Type:	Length (Bytes): 4	Repeat:
Comment:		
	OK	Cancel

Please note that the data length (Length) must match the received data. The Repeat parameter defines how often the data are created. Confirm the entry with OK.

The signal is sent via the **Transfer** button.

4.3.2 Write command

Right-click on **TCATAdsTest** to generate a test signal via the **Append Command...** context dialog.

🟓 Untitled - AmsAdsViewer	
File Edit View Capture Display Connection Analyze Help	
AmsViewer CATAdsTect Calact Server General Append Command Append TCATAdsTest Delete TCATAdsTest 2.16.4.203.1.1 Ams Port: 2700 Ads Timeout: 5000	
Ready	

Creating a test signal

A dialog for configuring the signal opens:

Append Comm	and	×
Name:	ExWriteReq	OK Cancel
Comment:		
Command:	Extended Write Request	

Assign a name, select the command Extended Write Request and confirm the entry with OK.

Example configuration for an extended write command

In main window specify the Index Group and the Index Offset for the ADS server:

🏓 Untitled - AmsAd	ds¥iewer				
File Edit View Ca	pture Display Connection Analyze	Help			
─ AmsViewer ─ TCATAdsTest └─ ExWriteReq	Extended Write Request General Index • Hex C Dec Index Group: 0x10000				Transfer
	Index Offset: 0x0	Error Code:			
	Data Insert Item Append Item Edit Item Delete Item	Туре	Byte Comm	ent	
Ready					

The data to be written can be added the context menu Append Item (right-click).

In the following dialog the Type and content (Data) of the data can be specified:

Edit Item			×
Data: 1234	Type:	Length (Bytes):	Repeat:
Comment:			
		OK	Cancel

Please note that your ADS server supports the data length (Length). The Repeat parameter defines how often the data are created. Confirm the entry with **OK**.

The signal is sent via the **Transfer** button.

More Information: www.beckhoff.com/automation

Beckhoff Automation GmbH & Co. KG Hülshorstweg 20 33415 Verl Germany Phone: +49 5246 9630 info@beckhoff.com www.beckhoff.com

