COM600 Station Automation Series COM610 3.2

Operator's Guide





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Operator's Guide

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1. About this manual

1.1. Copyrights

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1.2. Trademarks

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1.3. General

This manual provides thorough information on the Communication Gateway COM610 and the central concepts related to it. For more information on each topic related to a specific protocol, refer to the list of related documents in 1.8, Related documents.

Information in this operator's guide is intended for operators who perform every-day operations.

1.4. Document conventions

The following conventions are used for the presentation of material:

• The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.

- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ESC E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
 - The following convention is used for menu operations: MenuName > Menu-Item > CascadedMenuItem. For example: select File > New > Type.
 - The **Start** menu name always refers to the **Start** menu on the Windows taskbar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed:

Entered value is not valid. The value must be 0 to 30.

• You may be told to enter the string MIF349 in a field. The string is shown as follows in the procedure:

MIF349

• Variables are shown using lowercase letters:

sequence name

1.5. Use of symbols

This publication includes warning, caution, and information icons that point out safety related conditions or other important information. It also includes tip icons to point out useful information to the reader. The corresponding icons should be interpreted as follows.



The electrical warning icon indicates the presence of a hazard which could result in electrical shock.



The warning icon indicates the presence of a hazard which could result in personal injury.



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader to relevant facts and conditions.



The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

1.6. Terminology

The following is a list of terms associated with the Communication Gateway COM610 that you should be familiar with. The list contains terms that are unique to ABB or have a usage or definition that is different from standard industry usage.

Term	Description
Alarm	An abnormal state of a condition.
Alarms and Events; AE	An OPC service for providing information about alarms and events to OPC clients.
Data Object; DO	Part of a logical node object representing specific information, e.g., status or measurement. From an object-oriented point of view a data object is an instance of a class data object. DOs are normally used as transaction objects; i.e., they are data struc- tures.
Device	A physical device that behaves as its own communication node in the network, e.g. protection relay.
Event	Change of process data or an OPC internal value. Normally, an event consists of value, quality and timestamp.
Intelligent Electronic Device	A physical IEC 61850 device that behaves as its own commu- nication node in the IEC 61850 protocol.
LON	A communication protocol developed by Echelon.
LON Application Guideline for substation automation; LAG	A proprietary method of ABB on top of the standard LON pro- tocol.
OPC	Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry.
Property	Named data item.
SPA	ABB proprietary communication protocol used in substation automation.

1.7. Abbreviations

The following is a list of abbreviations associated with the Communication Gateway COM610 that you should be familiar with. See also 1.6, Terminology.

Abbreviation	Description
AE	Alarms and Events
CET	Communication Engineering Tool
DO	Data Object
GW	Gateway, component connecting two communication networks together
HMI	Human Machine Interface
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
LAG	LON Application Guideline for substation automation
LAN	Local Area Network
NCC	Network Control Center
SLD	Single Line Diagram

1.8. Related documents

Name of the manual	MRS number
COM600 User's Guide	1MRS756125
DNP LAN/WAN Master (OPC)	1MRS756566
DNP Serial Master (OPC)	1MRS756567
DNP LAN/WAN Slave (OPC)	1MRS755496
DNP Serial Slave (OPC)	1MRS755495
External OPC Client Access	1MRS755564
IEC 60870-5-101 Slave (OPC)	1MRS755382
IEC 60870-5-103 Master (OPC)	1MRS752278
IEC 60870-5-104 Slave (OPC)	1MRS755384
IEC 61850 Master (OPC)	1MRS755321
LON-LAG Master (OPC)	1MRS755284
Modbus Serial Master (OPC)	1MRS756126
Modbus TCP Master (OPC)	1MRS756445
SPA Master (OPC)	1MRS752275
SPA Router (OPC)	1MRS755497

1.9. Document revisions

Document version/date	Product revision	History
A/16.10.2006	3.0	Document created
B/21.12.2007	3.1	Document revised
C/17.06.2008	3.2	Document revised

2. Introduction

2.1. Product overview

Communication Gateway COM610 acts as an embedded communication gateway between substation automation protection and control devices and Network Control Centers (NCC).

COM610 uses an embedded operating system and runs in a dedicated industrial computer without moving parts.

The products are configured using a separate engineering PC that is connected via the local area network (LAN). For more information, refer to COM600 User's Guide.

Gateway Functionality

The gateway functionality provides a framework that enables the use of OPC server and client components, such as OPC Client for IEC 60870-5-101 and OPC Server for LON LAG 1.4. For more information, refer to COM600 User's Guide.

3. Operation of the COM610

3.1. Opening a project in CET

To open a project in CET:

- 1. Select File > Open/Manage Project....
- 2. In the Open/Manage Project dialog, select the required location for the project:
 - Projects on my computer
 - Projects on network
- 3. Expand the projects list, by clicking on the + symbol, to select the required project.
- 4. Click Open Project

3.2. Gateway management

The Gateway Management tool enables you to transfer the configurations of the objects to the COM600 computer.

To be able to use the Gateway Management Tool, the engineering computer must be connected to the COM600 computer. The IP address of the used ethernet port in the COM600 computer must be entered to the corresponding Gateway object property. For more information, see COM600 User's guide.

To open the Gateway Management tool, right-click the Gateway object in Communication Engineering Tool (CET) and select **Management**.

- To copy the configurations of all servers and clients to the Gateway computer, click **Update configuration**.
- To restart all servers and clients with the latest configurations, click **Reload config-uration**.
- To transfer only the changed configurations and to restart only the changed server or client with new configurations, click **Update & reload configuration**.

3.3. License handling

The Gateway Management tool displays the license information for COM600 under License Information. The license and the protocols it supports have been predefined before the COM600 computer has been handed over by ABB.

The following information is shown in the window:

- owner of the license
- product revision
- protocols supported by the license.
- number of servers supported by the license.

- number of clients supported by the license.
- if WebHMI is enabled.

To update the license with a new set of protocols, order a new license from ABB and update it to COM600 with Communication Engineering Tool.

To update the license:

- 1. Open the Gateway Management tool.
- 2. Click Update License.
- 3. Browse for the new license file and click **Open**.

The license is COM600 specific and the COM600 computer verifies the compatibility of the license. Also the servers and clients verify the license.

4. Diagnostics

4.1. General about diagnostics

Communication Engineering Tool (CET) provides comprehensive functions for diagnosing the operation of the Gateway. This includes communication diagnostics with monitoring the communication channel, diagnostic counters and IED specific communication status and diagnostic counters. It is also possible to monitor and control process data and follow the data flow on the Gateway using diagnostic functions of CET. Figure 4.1-1 displays a sample view of a diagnostic counter dialog. An example of an event log file is displayed in Figure 4.1-2

EET Loop 1 - Online diagnostics		
<u>File E</u> dit <u>Vi</u> ew <u>T</u> ools <u>Wi</u> ndow	<u>H</u> elp	
Online attributes		
State		
🔽 In use		
Diagnostic counters		
Transmitted messages:	16776	
Failed transmissions:	0	
Timeout errors:	0	
Received event messages:	12955	
Received data messages:	3236	
Received messages:	16191	
Parity errors:	0	
Overrun errors:	0	
Redundancy errors:	0	
Framing errors:	0	
Reset counters <u>R</u> efresh		
Tool connection		
Reconnect Follow selected		

SPAChnlDiag.jpg

Figure 4.1-1 An example of a SPA channel diagnostic counter dialog

OPCS_	_SPA_1_Eventlog.txt - Notepad				_	
<u>E</u> ile <u>E</u> dit	Format Yiew Help					
Info	2004-06-07 16:22:23.396	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	***	~
Info	2004-06-07 16:22:24.518	Configuration: Shutting down.	[2004 OF 10 06-20]	at suct ad	de de de	
Info	2004-06-07 16:22:43.164	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	444	
Info	2004-06-07 16:23:02.843	EventLog: """ OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	***	
Info	2004-06-07 10:42:20.398	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	tetete	
Triffo	2004-06-08 10:50:55.40/	EventLog: *** OPCS_SPA 1.0.107	2004-05-19 06:281	started	de de de	-
Info	2004-06-08 14:43:00.303	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	444	
Info	2004-06-08 14:50:40.078	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 06:28]	started	222	
Info	2004-06-08 10:47:04.291	Configuration: Shutting down	[2004-05-19 06:28]	starteu		
Info	2004-06-08 17:03:57.227	Diantion: Shutting down.	F2004 05 10 06+291	stanted	WARK	
Info	2004-00-08 17:03:37.038	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 00:20]	started	de de de	_
Info	2004-06-08 17:04:20.039	EventLog: *** OPCS_SPA 1.0.107	2004-05-19 00:201	started	totate	
Info	2004-06-09 10:30:13.804	EventLog: ### OPCS_SPA 1.0.107	2004-05-19 00:201	started	tatat	
Info	2004-06-09 11:15:04 775	Configuration: Shutting down	[2004-03-19 00.28]	starteu		
Info	2004-06-09 11:15:20 097	Dianti ogi kkk opce spå 1 0 107	[2004 05 10 06:29]	started	***	
Info	2004-06-09 11:15:26 270	EventLog: ### OPCS_SPA 1.0.107	[2004-05-19 00.28]	started	www	
Info	2004-06-09 11:13:30.270	EventLog: *** OPCS_SPA 1.0.107	[2004-05-19 00:28]	started	tetete	
Info	2004-06-09 11:01:13:195	EventLog: *** OPCS_SPA 1.0.107	2004-05-19 06:281	started	terterte	
Info	2004-06-09 15:47:42 919	EventLog: ### OPCS_SPA 1.0.107	2004-05-10 06:281	started	tetete	
Info	2004-06-10 12:40:57 524	Configuration: Shutting down	[2004-03-19 00.28]	starteu		
Info	2004-06-10 12:49:57:58 245	Evention: ### OPCS SPA 1 0 107	[2004-05-19 06:28]	started	***	
Info	2004-06-10 13:50:18 344	EventLog: *** OPCS SPA 1.0.107	2004-05-19 06:281	started	***	
Info	2004-06-13 12:36:47 529	EventLog: *** OPCS SPA 1.0.107	[2004-05-19 06:28]	started	where:	
Info	2004-06-13 13:07:53 002	EventLog: *** OPCS SPA 1.0.107	2004-05-19 06:281	started	terterte	
Info	2004-06-14 08:17:51 787	Evention: *** OPCS SPA 1 0 107	2004-05-19 06:281	started	www	
Info	2004-06-14 08:24:04 413	Configuration: Shutting down	[2004-03-13 00120]	scar cea		
Info	2004-06-14 08:24:04.413	Evention: ### ODCS SPA 1 0 107	[2004-05-19 06:28]	started	***	
Info	2004-06-14 08:24:27.856	Evention: *** OPCS SPA 1.0.107	[2004-05-19 06:28]	started	***	
Info	2004-06-14 08:26:58 193	Evention: *** OPC5 SPA 1.0.107	2004-05-19 06:281	started	www	
Info	2004-06-14 09:48:05.221	EventLog: *** OPCS_SPA 1.0.107	2004-05-19 06:281	started	de de de	
Info	2004-06-14 09:01:56.555	EventLog: *** OPC5_SPA 1.0.107	2004-05-19 06:281	started	terterter	-
						~
<						≥

EventDial.jpg

Figure 4.1-2 An example of a SPA event log file

4.2. Data object diagnostics

You can monitor and control the data objects under the Gateway's object tree with Data object diagnostics.

To monitor and control the data objects:

- 1. Right-click the Gateway.
- 2. Select **Data object diagnostics** from the shortcut menu, see Figure 4.2-1. The Data object diagnostic dialog opens.
- 3. Drag and drop data objects from the object tree to the Data object diagnostics.

or

- 1. Select a specific data object from the object tree.
- 2. Select **Tools > Online diagnostics**.

Edit Yew Iools Window Help				
ame	Value	Quality	Timestamp	Write value
hannel 3\H001_REF 543_50\LD1\C5WI1\Pos\stVal	1	GOOD (0xc0)	2004/06/28 17:35:20.493	1
hannel 3\H001_REF 543_50\LD1\C5WI1\Pos\subYal	0	BAD (0×0)	1601/01/01 02:00:00.000	1.
hannel 3[HUU1_KEF 543_50(LD1)CSWI1)Pos/subID		BAD (0x0)	1601/01/01 02:00:00.000	Refresh
hannel 31H001_REF 543_50(LD1)CSWI11Pos/subEna	Ealse	GOOD (0xc0)	1601/01/01 02:00:00.000	
hannel 3\H001_REF 543_50\LD1\C5WI1\Pos\stSeld	False	GOOD (0xc0)	2004/06/28 17:35:20.519	Excluded items
hannel 3\H001_REF 543_50\LD1\CSWI1\Pos\ctlSelOff	1	GOOD (0xc0)	2004/06/28 17:35:17.286	
hannel 3\H001_REF 543_50\LD1\C5WI1\Pos\ctl5elOn	0	GOOD (0xc0)	1601/01/01 02:00:00.000	
hannel 3\H001_REF 543_50\LD1\C5WI1\Pos\ctlOperOff	1	GOOD (0xc0)	2004/06/28 17:35:20.231	
hannel 3(HUU1_KEF 543_50(LD1)CSWI1)Pos(ctiOperOn hannel 3(HU01_REE 543_50)LD1/CSWI1\Pos(ctiCan	0	GOOD (0x00)	1601/01/01 02:00:00.000	
amersproor_na_sts_sourcement(commencement		3000 (0.00)	101/01/01 02:00:00:000	

DataObjDiagnos.jpg

Figure 4.2-1 Data object diagnostics

To change the value of a data object attribute:

- 1. Select a specific attribute.
- 2. Write a new value to the text box under the Write value button.
- 3. Click **Write value** to change the value.

To filter the displayed data object:

- 1. Click **Excluded items**.
- 2. Notepad opens. Write to Notepad the data object types you want to exclude from the Data object diagnostics view.
- 3. Save the Notepad file by selecting **File > Save**.

4.3. Diagnostic services of OPC servers and clients

You can control and monitor the server and client channel and device communication in the communication structure of the Project Explorer. You can take channels/subnetworks and devices into use or out of use via the respective diagnostics function. You can also monitor the channel/subnetwork and device communication with the help of various diagnostic counters, and check the device status information, see Figure 4.3-1.

e <u>E</u> dit <u>V</u> iew <u>T</u> ools <u>Wi</u> ndow	<u>H</u> elp
Online attributes	
State	
🔽 In <u>u</u> se	
Diagnostic events enabled	
Status information	
Connection status:	OK
Detailed status:	Device communication OK
Diagnostic counters	
Reply timeouts:	0
Reset counters <u>R</u> efresh	
Address information	
Subnet number:	7
Node number:	35
Clock status	
External clock connection:	Connected
External clock status:	Synchronized
Daylight saving status:	Summer time
Daylight saving update:	Not within next hour
Leap second correction:	Not within next hour
Time accuracy:	OK
ool connection	

LONClockMaster.jpg

Figure 4.3-1 An example of LON Clock Master online diagnostics

For more detailed information and instructions on controlling and monitoring channel and device communication, refer to the respective user's guide for the client or server (see 1.8, Related documents).

4.4. Signal diagnostics

OPC clients have a diagnostic function which makes it possible to monitor the flow of process data changes and commands. Activate the function by marking the Diagnostic Events Enabled check box, located in the Online diagnostics function of the IEC101/IEC104 Device. When the diagnostic function is activated, the IEC101 OPC Client Alarm & Event server generates events with information about data changes and commands.

	Total Manual	Help									
vent count:	22										
ime	Туре	Source	M Valu	Quality	Cause	Address	ASDU	COT	Qualifier	^	Refre
004.05.25 13:00:12	2.682 DM - Indication	LON Channel(LON REX JED)Logical Device(LLND)/MV)mag	6	GOOD (0xx0)	Spontaneous	22001	M_ME_NA_1	3			
04.05.25 13:00:14	771 DM - Indication	LON Channel/LON REX JED/Logical Device/LLND///M/mag		GCCD (0xd)	Spontaneous	22001	M_ME_NA_1	3			Settin
004.05.25 13:01:12	2.859 DM - Command	LON ChannellLON REX JED/Logical Device(LLND/DPC				1000	C_DC_NA_1	6	S/E=L QU=		
004.05.25 13:01:12	.906 DM - Comma	LON Channell, ON REX JED/Logical Device(LLND/DPC				1000	C_DC_NA_1	- 7			Qer
004.05.25 13:01:15	5.031 DM - Command	LON ChannellLON REX JED/Logical DeviceULIND/DPC				1000	C_DC_NA_1	6	S/E=0 QU=		
004.05.25 13:01:15	5.109 DM - Comma	LON Channel(LON REX JED)(Logical Device(LLND)(DPC				1000	C_DC_NA_1				Record
004.05.25 13:01:19	5.109 DM - Comma	LON Channel(LON REX JED)Logical Device(LLND)(DPC				1000	C_DC_NA_1	10			1000000
004.05.25 13:01:15	5.141 DM - Indication	LON Channell, ON REX JED/Logical Device/LLND/MY/mag	1	GOOD (0x20)	Spontaneous	22001	M DO TO A	3			E Artic
004.05.25 13:01:15	101 DM Indication	LON Channelli, ON REX JED/Logical Device/LIN0(DPC)stval		GOOD (0800)	Spontaneous	20004	M ME NA A				Ne Mour
004.05.25 13:01:13 004.05.25 13:01:15	291 DM - Indication	LON Channelli ON REX JED/Logical Device/LIN0/M (mag		GOOD (0000)	Spontaneous	22001	M ME NA 1	3		-	Auto
004.05.25.13:01:12	250 DM - Indication	LON Channelli ON REX 300 [Logical Device (LN0)/Winag	10	6000 (0.00)	Spontaneous	22001	M ME NO 1				
004.05.25.13:01:23	687 DM - Annica	1EC101 Balanced Channel JEC101 JED		- doop (0.00)	applicatieous	10022	C 10 NA 1	6	001-20		
004.05.25.13:01:23	687 DM - Comma	IECIOI Balanced Channel IECIDI IED					C 1C NA 1	7	400-00		
004.05.25 13:01:15	5.141 DM - Indication	LON Channelli ON REX IED/Logical Deviceli LIND/DPC)stVal		G000 (0xm)	Refreshed	14000	M DP NA 1	2n			
004.05.25 13:01:17	.250 DM - Indication	LON Channellu ON REX JED/Logical Device ULND/MV/mag	10	GOOD (0xc0)	Refreshed	22001	M ME NA 1	20			
004.05.25 13:01:23	.703 DM - Comma	IEC101 Balanced Channel IEC101 IED				0	C IC NA 1	10			
004.05.25 13:01:26	.735 DM - Indication	LON Channel(LON REX JED)Logical Device(LLND)/MV(mag	10	GOOD (0xc0)	Spontaneous	22001	M ME NA 1	3			
004.05.25 13:01:35	5.843 DM - Indication	LON ChannellLON REX JED/Logical Device/LLND/MM/mag	10	GOOD (0xx0)	Spontaneous	22001	M ME NA L	3			
004.05.25 13:02:00	0.095 DM - Indication	LON ChannellLON REX JED/Logical DeviceULIND/M/mag	10	GOCD (0xc0)	Spontaneous	22001	M ME NA 1	3		-	

IEC101AEClient.jpg

Figure 4.4-1 IEC101 Slave OPC Client Diagnostic AE client

4.5. Diagnostic Web Server

The Diagnostic Web Server of the Gateway provides an overall view of the communication status of the Gateway and the possibility to monitor the diagnostic counters of the communication channels/subnetworks and IED communication. Figure 4.5-1 displays the gateway objects in a tree view.

A red cross over the Gateway icon in the object tree indicates that there is a fault in the communication structure. Expand the tree to view the hierarchy deeper and to identify the device with a missing configuration or causing the error. The properties of a certain object in the communication structure can be seen on the right when clicking on the object in the tree view.

:: COM 610 (User: admin[Administ	rator), Connection: local) - Nicrosoft Internet Explorer		
Edit Yew Fgvorites Loois Help			
xx • 🜍 · 💽 🛣 🔑	Search 👷 Favorites 🕢 🔂 🖧 🔟 • 🛄 🛍 🍪		
18			2006-10-04, 08:4
eral Heln Lonout			
nmunication 40	PVC-COM-600 > IEC61850 OPC Server > IEC61850 Subpetwor	k > 85C670 92	
PVC-COM-600			
DNP LAN Slave OPC Client	Communication Status		
B TEONP LAN Channel	Description	Value	
DNP Slave LAN 1ED	Connection status	OK	
ELECTION OPC Server	Detailed status	RCB: Reading data set (97)	
= 1ED_0002			
REC670_90	Diagnostic Counters		
REC670_91	Description	Value	
REC670_92	Sent connection requests	296	
PEC670_93	Paceived connection register of	206	
EF543_50	Received connection replies on	0	
EF543_51	Cast economic contraction replies error		
REF543_52	Sent connection concludes	285	
PEP 543_53	Received connection concludes	0	
REF543 55	Sent requests	28331	
EF543_56	Received replies ok	28330	
- EF 543_59	Received replies error	0	
REF543_62	Sent variable read requests	287	
REP 543_03	Received variable read replies ok	287	
PEF543R_61	Received variable read replies error	0	
EF545_64	Sent variable write requests	3421	
- REF 545_65	Received variable write replies ok	3421	
REM543_57	Received variable write replies error	0	
FEM543_58	Received information reports	286	
REM543_67	Received status request	111	
Modbus Serial OPC Server	necentes status request		
SPA OPC Server			
SPA Channel			
REF 543_81			
DEM543 83			
- RET543 82			
ET543 84			
Totation/Remote			
			🔒 🍤 Local intranet
			Webserver

Figure 4.5-1 An example of a web page from the Gateway diagnostic web server

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