



RPA 2004

Including 61850 Edition

A Real-time Protocol Analyser Version 3.0

...accurate Analysis, better decisions, faster results



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RPA 2004: Sample View

The screenshot shows a window titled "Protocol Analysis ..." with three columns of data. The first column contains raw hexadecimal data with timestamps and device identifiers. The second column shows the interpreted protocol messages. The third column displays the mapped information in a structured format.

Raw Information From RTU/SCADA	Protocol Interpreted Information	RTU/SCADA Information Mapped to user database displayed similar to SCADA/DSC Alarms views
Master (May 31, 2007 - 18:53:30:845) : 68 04 83 00 00 00	TESTFR CON	
Slave (May 31, 2007 - 18:53:30:845) : 68 04 83 00 00 00	TESTFR CON	
Master (May 31, 2007 - 18:53:31:845) : 68 04 43 00 00 00	TESTFR ACT	
Slave (May 31, 2007 - 18:53:31:861) : 68 0E 00 00 00 00	Response: Double Point Information	Bay:RWP
03 01	ASDU->Double Point Info<03>,Count:1[SQ:0]	Description:PUMP-1 OUTLET VALVE V-5
03 FF 05 00	COT:<No Test><Positive Confirm>Cause of Trans:Spontaneous[3]	DI Info:OFF,
F9 2A 00 01	Obj Addr:11001,DI Info:OFF,[BL:0,SB:0,NT:0,IV:0]	
Slave (May 31, 2007 - 18:53:31:861) : 68 04 83 00 00 00	TESTFR CON	
Slave (May 31, 2007 - 18:53:33:111) : 68 0E 00 00 00 00	Response: Double Point Information	Bay:RWP
03 01	ASDU->Double Point Info<03>,Count:1[SQ:0]	Description:PUMP-1 OUTLET VALVE V-5
03 FF 05 00	COT:<No Test><Positive Confirm>Cause of Trans:Spontaneous[3]	DI Info:OFF,
F9 2A 00 01	Obj Addr:11001,DI Info:OFF,[BL:0,SB:0,NT:0,IV:0]	
Slave (May 31, 2007 - 18:53:33:970) : 68 0E 02 00 00 00	Response: Double Point Information	Bay:RWP
03 01	ASDU->Double Point Info<03>,Count:1[SQ:0]	Description:PUMP-1 OUTLET VALVE V-5
03 FF 05 00	COT:<No Test><Positive Confirm>Cause of Trans:Spontaneous[3]	DI Info:OFF,
F9 2A 00 01	Obj Addr:11001,DI Info:OFF,[BL:0,SB:0,NT:0,IV:0]	
Master (May 31, 2007 - 18:53:34:970) : 68 04 43 00 00 00	TESTFR ACT	
Master (May 31, 2007 - 18:53:34:970) : 68 04 01 00 04 00	Supervisory Frame Ack No: 2	
Slave (May 31, 2007 - 18:53:36:111) : 68 04 43 00 00 00	TESTFR ACT	
Master (May 31, 2007 - 18:53:36:127) : 68 04 83 00 00 00	TESTFR CON	
Slave (May 31, 2007 - 18:53:36:595) : 68 0E 00 00 00 00	Response: Double Point Information	Bay:RWP
03 01	ASDU->Double Point Info<03>,Count:1[SQ:0]	Description:PUMP-1 OUTLET VALVE V-5
03 FF 05 00	COT:<No Test><Positive Confirm>Cause of Trans:Spontaneous[3]	DI Info:OFF,
F9 2A 00 01	Obj Addr:11001,DI Info:OFF,[BL:0,SB:0,NT:0,IV:0]	
Slave (May 31, 2007 - 18:53:38:595) : 68 04 43 00 00 00	TESTFR ACT	
Master (May 31, 2007 - 18:53:38:611) : 68 04 83 00 00 00	TESTFR CON	
Slave (May 31, 2007 - 18:53:38:642) : 68 0E 00 00 00 00	Response: Double Point Information	Bay:RWP
03 01	ASDU->Double Point Info<03>,Count:1[SQ:0]	Description:PUMP-1 OUTLET VALVE V-5
03 FF 05 00	COT:<No Test><Positive Confirm>Cause of Trans:Spontaneous[3]	DI Info:OFF,
F9 2A 00 01	Obj Addr:11001,DI Info:OFF,[BL:0,SB:0,NT:0,IV:0]	
Master (May 31, 2007 - 18:53:39:642) : 68 04 01 00 02 00	Supervisory Frame Ack No: 1	

Raw Information From RTU/SCADA

Protocol Interpreted Information

RTU/SCADA Information Mapped to user database displayed similar to SCADA/DSC Alarms views

RPA 2004: Introduction

RPA 2004 is a state-of-the-art solution designed for reliable & precise SCADA protocol analysis and simulation. Designed for Electrical Professionals as users, RPA does not require specific Protocol Knowledge. RPA is developed using latest technologies, which helps to integrate SCADA/DCS database into analyser resulting in faster analysis. RPA 2004 is a full-featured protocol test unit that provides the user with a powerful and flexible tool for testing and monitoring of SCADA system (including SCADA Master and SCADA RTUs/IEDs). Advanced features like integration with MS Excel for Reports Generation and refined Graphical User Interface (specifically designed considering Electrical professionals as users) allows faster and accurate diagnosing of communication problems. RPA is available in two variations:

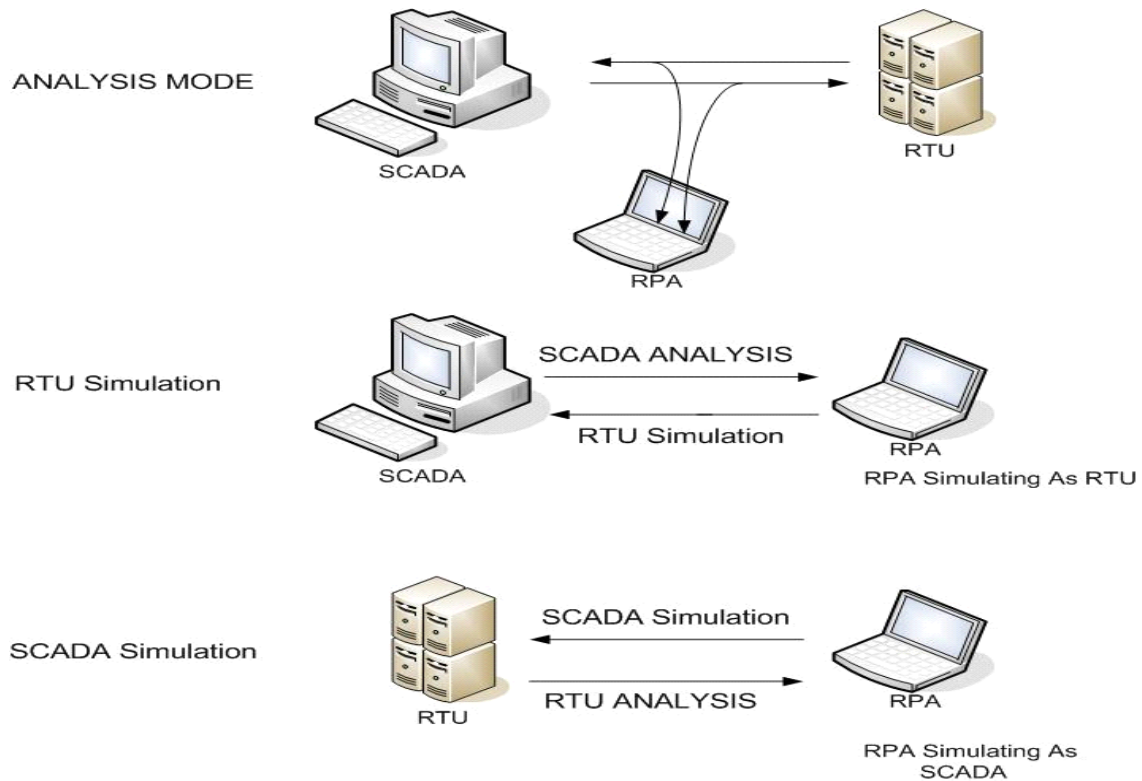
- ✓ RPA 2004 Professional: Richly featured analysis and simulation covering all protocol related activities. This variation is developed for End Users, Utilities and Onsite Testing Activities

RPA 2004: Operating Modes

Three modes of operating are supported by RPA.

- ✓ Monitor Mode: In this mode RPA monitor the communication between SCADA and other end device. Interpreted message is displayed for both.
- ✓ RTU Simulation Mode: This allows RPA to act as RTU for Master SCADA Station. Convenient user database mapped set-up menus allow the user to specify points to Simulate. Similar SCADA like displays, with possibility to define sequence of points to be simulated in order to make simulation representing real world scenarios.
- ✓ SCADA Simulation Mode: This allows RPA to act as SCADA for testing the RTUs, Gateways and other remote end systems. Easy to configure simulation templates and possibility to define the sequence of simulation are key features of this mode.

RPA 2004: Operating Modes



RPA 2004: Protocol Support

Protocol	SCADA Mode	RTU Mode	Analysis Mode
IEC 60870 – 5 -101	•	•	•
IEC 60870 – 5 -103	•	•	•
IEC 60870 – 5 -104	•	•	•
MODBUS RTU	•	•	•
MODBUS ASCII	•	•	•
MODBUS TCP	•	•	•
DNP 3	•	•	•
IEC 61850	•	•	•
HNZ (Under Development)	•	•	•
Profibus DP (Under Development)	•	•	•

RPA 2004: Product Features

- ✓ Full featured Protocol Simulation and Analysis.
- ✓ Full Compatibility with Industry standard Protocols
- ✓ Simulation of Multiple SCADA/ RTUs/IEDs
- ✓ History Logging.
 - » Database Mapped Analysed Data with Time Stamping
 - » Protocol Mapped Analysed Data with Time Stamping
 - » RAW Data with Time Stamping
 - » All communication and protocol related communication errors with time stamping
- ✓ Status Indication Showing Success and Failure of Messages.
- ✓ Reporting is the one of the highlights of RPA. Supports direct report generation in Microsoft® EXCEL® showing:
 - » Time Tagged Raw Data
 - » Time Tagged Protocol Analysed Data
 - » Time Tagged Raw Data Databased Mapped Data
 - » Failure Analysis Reports
- ✓ Full integration of With SCADA/RTU Data Base, helping in faster and accurate simulation and analysis. Supported File Formats for Database imports
 - » TEXT
 - » EXCEL / WORD
 - » BINARY / XML
- ✓ RPA records all the protocol related statistics that facilitates continuous monitoring. Following counters are provided:
 - » Total Message Sent / Received
 - » Parity Errors
 - » Framing Errors
 - » Protocol Errors

RPA 2004: Feature Chart

Features	RPA 2004 Professional
Simulation Type	
• Monitor Mode	•
• RTU Mode	•
• SCADA Simulation Mode	•
• Multiple SCADA/RTU's/IED's	•
Report Archiving	
• Logging with Time stamping	•
• Fault analysis report	•
Report Format	
• EXCEL	•
Main Displays	
• Raw data	•
• Protocol Interpretation	•
• Database Interpretation	•
• Parameter setup	•
• Database Import	•
• Simulation setup	•
Error Reporting	
• No. of Master/Slave Messages	•
• No. of Master/Slave Correct Messages	•
• No. of Master/Slave Port/Hardware Messages	•
• No. of Master/Slave Other Error Messages	•

RPA 2004: 61850 Sample View

The screenshot displays the RPA Standard software interface. The main window shows a tree view of a 61850 Master project. The tree is expanded to show a Server DB (P00BCC02LD0) containing an LLNO (LLNO) with a Mod (Mod) block. The Mod block contains a Read node with a value of 0000000000000000 and a type of Integer(4). Other nodes in the tree include Beh, Health, DayLight, CO, CF, DC, BR, EX, LPHD1, CDGGIO1, and P00BCC02LD1. The output window on the right shows a log of MMS communication events, including initialization, connection errors, and stopping messages.

IED	Value	Type
Server DB		
P00BCC02LD0		
LLNO		
Mod	0000000000000000	Integer(4)
Read	{0000000000000000},1970-01-01 00:00:00.000(LS:F CF:F CNS:F A:00)}	Integer(4)
stVa		Bit String(13)
q	{0000000000000000}	Integer(4)
t	1970-01-01 00:00:00.000(LS:F CF:F CNS:F A:00)}	UTC Time
Beh	{0,[0000000000000000]},1970-01-01 00:00:00.000(LS:F CF:F CNS:F A:00)}	
Health	{0,[0000000000000000]},1970-01-01 00:00:00.000(LS:F CF:F CNS:F A:00)}	
DayLight	{0,[0000000000000000]},1970-01-01 00:00:00.000(LS:F CF:F CNS:F A:00)}	
CO		
CF		
DC		
BR		
EX		
LPHD1		
CDGGIO1		
P00BCC02LD1		
Data Sets		
Buffered Reports		
Un-Buffered Reports		

RPA 2004: IEC 61850 Client

- ✓ Import ICD /CID /SCL File
- ✓ Simulation / Interface with Upto 1000 IEDs Simultaneously
- ✓ Subscribe to Control Blocks
 - Buffered Reports Indexed / Non Indexed
 - Un Buffered Reports Indexed / Non Indexed
 - GOOSE Block
- ✓ Create Dynamic Datasets in IEDs
- ✓ Cyclic Messages:
 - General Interrogation / Time Synch
 - Read Nodes
- ✓ Control Commands / Write Operations
- ✓ Logs / File Services
- ✓ Colour Coded Definitions to highlight the changes in values received during reports for easy identification of change in data.

RPA 2004: IEC 61850 Server

- ✓ ICD /CID /SCL File: Import / Create
- ✓ Interface with Upto 4 IEC 61850 Clients Simultaneously
- ✓ Control Blocks Implementation
 - Buffered Reports Indexed / Non Indexed
 - Un Buffered Reports Indexed / Non Indexed
 - GOOSE Block
- ✓ Support for Dynamic Datasets creation
- ✓ Support Read / Write MMS
- ✓ Logs / File Services
- ✓ Interated IED Browser
 - View Nodes
 - Simulation from Bowser

RPA 2004: Partial Client List

Customer Name	End User Company Name	Quantity
ALSTOM T & D Systems LTD, Noida	Sasaram, PGCIL	1
AREVA T & D Systems India Ltd, Noida	Salakati, PGCIL	1
Larsen and Toubro Limited, Chennai	NPCIL, Tarapur	2
Bharat Heavy Electricals Limited, Hyderabad	BHEL R & D, Hyderabad	8
Protocol Automation	BHEL R & D, Bangalore	5
AREVA T & D Systems India Ltd, Noida	AREVA R & D	4
AREVA T & D Systems India Ltd, Noida	Jammu, PGCIL	3
SP Paryavaran Pvt. Ltd.	MES, India	1
AREVA T & D India Ltd, Noida	Meghalaya, PGCIL	2
IPS Automation, India	PEPSI Co.	1
Honeywell India	PGCIL, Vijayawada	2
AREVA T&D	Various Projects	12
Chemtrol	PGCIL	1
CDAC	Internal	1
SIEMENS	PGCIL	7
ALSTOM	PGCIL	169