

Single point to double point and double point to single point information

Single point to double point information

This example shows how to convert single point information from Modbus RTU to double point information for IEC 60870-5-104.

To begin, open the **Devices** sheet and define two protocols. One row should specify the Modbus RTU master configuration, including which physical port on WCC Lite will be used for communication. Another row should define the IEC104 slave protocol and its network parameters. Make sure all other fields follow the requirements of your setup.

name	description	device_alias	enable	protocol	id	device	baudrate	databits	stopbits	parity	flowcontrol	scan_rate_ms	poll_retry_count	timeout_ms	serial_delay	mode	host	port	asdu_size	cot_size	ioa_size	rtt	swt	t1	t2	t3	time_sync	message_size	cache_size
Modbus_device	modbus	Modbus	1	Modbus RTU	1	PORT2	9600	8	1	none	none	300	3	10000	50	rtu													
SCADA_device	SCADA	SCADA_104	1	IEC 60870-5-104 slave													192.168.1.2	2404	2	2	3	8	12	15	10	20	1	249	100

In the **Signals** sheet, define two separate Modbus input signals with distinct aliases. These signals will represent the two bits used to build the double point status. Then create a signal for the IEC104 slave with data type 31 ("M_DP_TB_1" Double-point information with time tag). In the source alias field, write both signal aliases separated by a space. This way, both Modbus signals will be used to generate a single double point value.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	source_math_expression	absolute_threshold	log	job_todo	tag_job_todo	number_type	common_address	info_address	gi	data_type
signal1	Modbus	signal1			1		1	1	3.1.1	3.1.1	SIGNED16				
signal2	Modbus	signal2			1		1	1	3.2.1	3.2.1	SIGNED16				
double	SCADA_104	double	Modbus Modbus	signal1 signal2	1	2*TagValue("tag/Modbus/signal1/out")+TagValue("tag/Modbus/signal2/out")		1				1	1	1	31

To determine the correct double point output, use a source math expression. The following logic is used:

If both signal1 and signal2 are 0, the double point result will be 0.

If both are 1, the result will be 3.

If signal1 is 1 and signal2 is 0, the result will be 2.

If signal1 is 0 and signal2 is 1, the result will be 1.

To test the setup, upload the Excel configuration to WCC Lite. Connect WCC Lite to your computer via Vinci expert (or other RS to USB converter) and run VINCI simulation program. Use one VINCI window configured as IEC104 master. Use a second VINCI window as a Modbus RTU slave. Ensure all settings (e.g. ports, baud rate) match your Excel configuration. Run both simulations and make sure both protocols are connected.

PROTOCOL CONNECTIONS					
Device name	Device alias	Protocol	Host	Status	Timestamp
Modbus_device	Modbus	Modbus Serial master	PORT2	Connected	2025-04-30 07:40:40
SCADA_device	SCADA_104	IEC 60870-5-104 slave	192.168.1.2	Connected	2025-04-30 07:39:56

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
Modbus_device	signal1	Modbus	signal1	0				2025-04-30 08:27:57.35
Modbus_device	signal2	Modbus	signal2	0				2025-04-30 07:42:26.14
SCADA_device	double	SCADA_104	double	0				2025-04-30 08:27:57.35

On the Modbus slave side, create a tag matching the address used in your configuration. Change the tag value to trigger a change in double point state, and observe the corresponding updates in the IEC104 master tab or web interface

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
Modbus_device	signal1	Modbus	signal1	0				2025-04-30 08:49:24.48 ^
Modbus_device	signal2	Modbus	signal2	1				2025-04-30 08:44:59.100
SCADA_device	double	SCADA_104	double	1				2025-04-30 08:49:24.48

TI	Cause	ASDU	IOA	Value	Status	TimeTag
M_DP_TB_1 (31)	Spontan (3)	1	1	Off[1]		2025-4-30 5:49:2...

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
Modbus_device	signal1	Modbus	signal1	1				2025-04-30 08:51:06.21
Modbus_device	signal2	Modbus	signal2	0				2025-04-30 08:51:09.29
SCADA_device	double	SCADA_104	double	2				2025-04-30 08:51:09.29

TI	Cause	ASDU	IOA	Value	Status	TimeTag
M_DP_TB_1 (31)	Spontan (3)	1	1	On[2]		2025-4-30 5:51:9:...

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
Modbus_device	signal1	Modbus	signal1	1				2025-04-30 08:44:56.58
Modbus_device	signal2	Modbus	signal2	1				2025-04-30 08:44:59.100
SCADA_device	double	SCADA_104	double	3				2025-04-30 08:44:59.100

TI	Cause	ASDU	IOA	Value	Status	TimeTag
M_DP_TB_1 (31)	Spontan (3)	1	1	Indeterminate3[3]		2025-4-30 5:44:5...

Double point to single point information

This example demonstrates how to convert double point information from IEC 60870-5-104 to single point data for Modbus RTU.

Begin with the **Devices** sheet. One row should define the IEC104 slave using the appropriate port and the IP address of the host computer. Another row should define the Modbus RTU master, specifying which physical port on WCC Lite will be used for communication. Make sure all protocol parameters are correctly set.

name	description	device_alias	enable	protocol	id	device	baudrate	databits	stopbits	parity	flowcontrol	scan_rate_ms	poll_retry_count	timeout_ms	serial_delay	mode	host	port	asdu_size	cot_size	ioa_size	rtu	swt	t1	t2	t3	time_sync	message_size	cache_size
Modbus_device	modbus	Modbus	1	Modbus RTU	1	PORT2	9600	8	1	none	none	300	3	1000	50	rtu													
SCADA_device	SCADA	SCADA_104	1	IEC 60870-5-104 slave													192.168.1.2	2404	2	2	3	8	12	15	10	20	1	249	100

Open the **Signals** sheet. Define a Modbus signal using a function 1 (read discrete output coils). Then define a double point signal with data type 31 ("M_DP_TB_1" Double-point information with time tag) for the IEC104 protocol. Set the source alias to the Modbus signal you just created.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	absolute_threshold	log	job_todo	tag_job_todo	number_type	common_address	info_address	gi	data_type
signal	Modbus	signal			1	1	1	1;1;2	1;1;2	SIGNED16				
single	SCADA_104	single	Modbus	signal	1	1	1				1	1	1	31

WCC Lite will interpret the double point values and convert them to single point logic.

Value	State
00	indeterminate
01	off
10	on

11	indeterminate
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To simulate this setup, upload your configuration file to WCC Lite. Connect WCC Lite to your computer via Vinci expert (or any other RS to USB converter) and run VINCI simulation program. Start two simulations. One should act as the IEC104 master. The second should be a Modbus RTU slave, connected to the VINCI Expert port. Ensure all settings (e.g. ports, baud rate) match your Excel configuration. Run both simulations and make sure both protocols are connected.

Device name	Device alias	Protocol	Host	Status	Timestamp
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Modbus_device	Modbus	Modbus Serial master	PORT2	Connected	2025-04-30 09:03:15
SCADA_device	SCADA_104	IEC 60870-5-104 slave	192.168.1.2	Connected	2025-04-30 09:03:17

On the Modbus slave side, create a tag matching the address used in your configuration. Change the tag value to trigger a change in double point state, and observe the corresponding updates in the IEC104 master tab or web interface.

If Value box is checked, it means that this value is 1. Change tag values accordingly and observe the results on the web and IEC104 master tab:

▼ Tag

— □ ×

Name:

Type:

Read Coil Status (1)

Slave:

Address:

☐ Value

Lookup values:

☐ Use

Value	Custom value
False	
True	

▼ Tag

— □ ×

Name:

Type:

Read Coil Status (1)

Slave:

Address:

☐ Value

Lookup values:

☐ Use

Value	Custom value
False	
True	

Save

Cancel

Save

Cancel

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Modbus_device	signal	Modbus	signal	0				2025-04-30 09:30:45.49
SCADA_device	single	SCADA_104	single	0				2025-04-30 09:30:45.49

TI	Cause	ASDU	IOA	Value	Status	TimeTag
M_DP_TB_1 (31)	Spontan (3)	1	1	Indeterminate0[0]		2025-4-30 6:30:4...

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Modbus_device	signal	Modbus	signal	1				2025-04-30 09:36:24.54
SCADA_device	single	SCADA_104	single	1				2025-04-30 09:36:24.54

TI	Cause	ASDU	IOA	Value	Status	TimeTag
M_DP_TB_1 (31)	Spontan (3)	1	1	Off[1]		2025-4-30 6:36:2...

