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Flexitron group

TITAN

Application Note 10

Using a TITAN-based device such as a Modbus TCP/RTU Slave to send SMS messages, emails, SNMP traps, to synchronize time and to obtain positions, etc.

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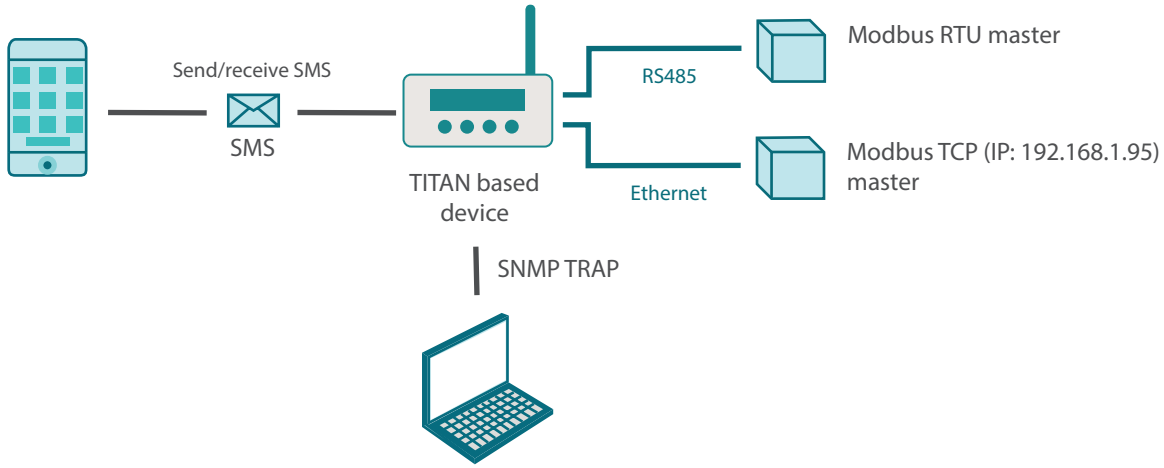
1. Introduction

TITAN-based devices have all the typical functionalities of 4G/3G/2G routers, as well as a series of added features that make them one of the most feature-packed routers on the market.

One of the added features is its ability to execute AT commands using Modbus TCP or Modbus RTU. A TITAN-based device can be configured as a Modbus TCP and/or Modbus RTU Slave device and, therefore, commands can be sent from a device that can act as a Modbus TCP Master or Modbus RTU Master. In this way, a Modbus TCP Master device or Modbus RTU Master device can both read and receive SMS messages, send EMAILS, send SNMP TRAPS, check the current time, check GSM coverage, check GPS positions, etc., all using a TITAN-based device.

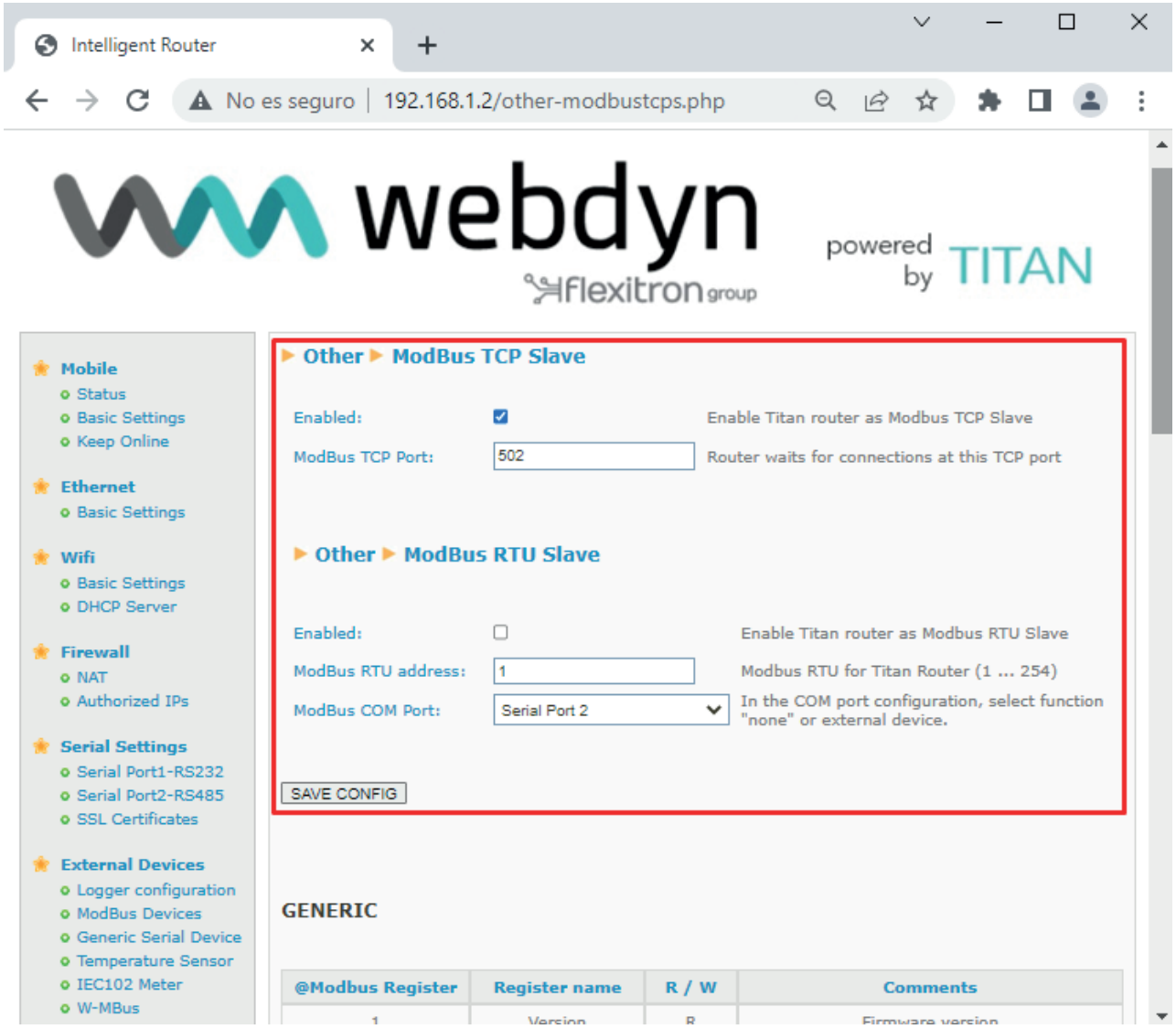
2. Description of the Example

In this example we are going to assume that we have a Modbus TCP Master device (a PLC) and we need to be able to send/receive SMS messages and send SNMP traps using Modbus TCP. Furthermore, we have a Modbus RTU Master device (another PLC) that needs to perform the same operations but using Modbus RTU over an RS485 bus.

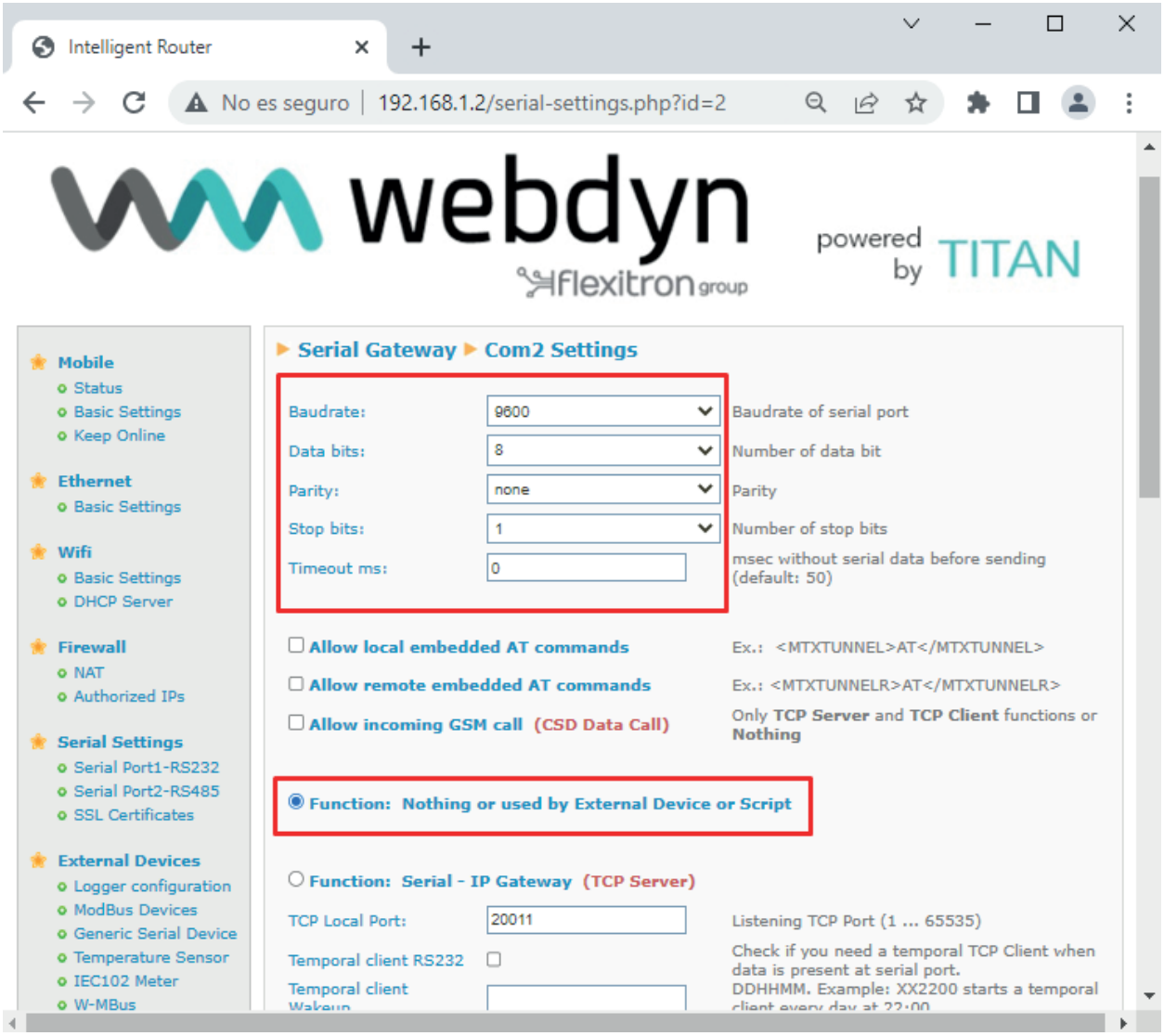


3. Configuring the TITAN-based device as a Modbus Slave

The first thing we need to do is configure the TITAN-based device so that it behaves like a Modbus TCP Slave. To do this, simply click on the “Other > Modbus TCP Slave” menu, select the “Enabled” box and specify the TCP Port (502 by default). To make it behave like a Modbus RTU Slave as well, we must activate the corresponding “Enabled” box and select the serial port we want to use, as well as the Modbus RTU address that we want the TITAN-based device to have as a Slave.



As well as activating the Modbus RTU Slave service, we must also configure the selected serial port. In this case, the COM2 serial port. Go to the “Serial Settings > Serial Port2-485” menu and configure it appropriately.



It is useful to look at the lower part of the screen as it shows a map of Modbus TCP registers for the TITAN-based device. Once the TITAN-based device has been configured, it must be restarted to accept the new configuration.

4. Sending an SMS Message via Modbus TCP or RTU

Next we must send an SMS message. As we mentioned before, this can be done from any Modbus TCP or RTU Master device or simulator.

We are going to send an SMS message with the text “ALARM” to phone number 681319891. The AT command to send an SMS from the TITAN-based device would be:

```
AT^MTXTUNNEL=SMS,681319891,ALARMA
```

Which, in ASCII mode would be, in 33 characters

100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
A	T	^	M	T	X	T	U	N	N	E	L	=	S	M	S	,
65	84	94	77	84	88	84	85	78	78	69	76	61	83	77	83	44

117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132
6	8	1	3	1	9	8	9	1	,	A	L	A	R	M	A
54	56	49	51	49	57	56	57	49	44	65	76	65	82	77	65

Therefore, first we will enter the full command (all 33 registers) starting at register 100 in the TITAN-based device, i.e. in the memory area (or mailbox) where said AT command must be dumped so that it can be executed.

Once these Modbus registers have been written to the TITAN-based device, the AT command must be executed. To do this, the length of the AT command to be executed must be written to Modbus register 98, in this case 33.

As soon as we write the value 33 to register 98, the AT command will be executed. We should receive the SMS in a matter of seconds. To check the response to said AT command, simply read register 99. This register will show the length of the response. In this case it is 21. To obtain the response, we must read 21 registers starting at position 500, which is where the response to the execution of an AT command is stored. If we read the registers we get:

500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520
[Cr]	[Lf]	[Cr]	[Lf]	+	C	M	G	S	:		9	4	[Cr]	[Lf]	[Cr]	[Lf]	O	K	[Cr]	[Lf]
13	10	13	10	43	67	77	71	83	58	32	57	52	13	10	13	10	79	75	13	10

As long as the AT response contains OK, the AT command was executed correctly.

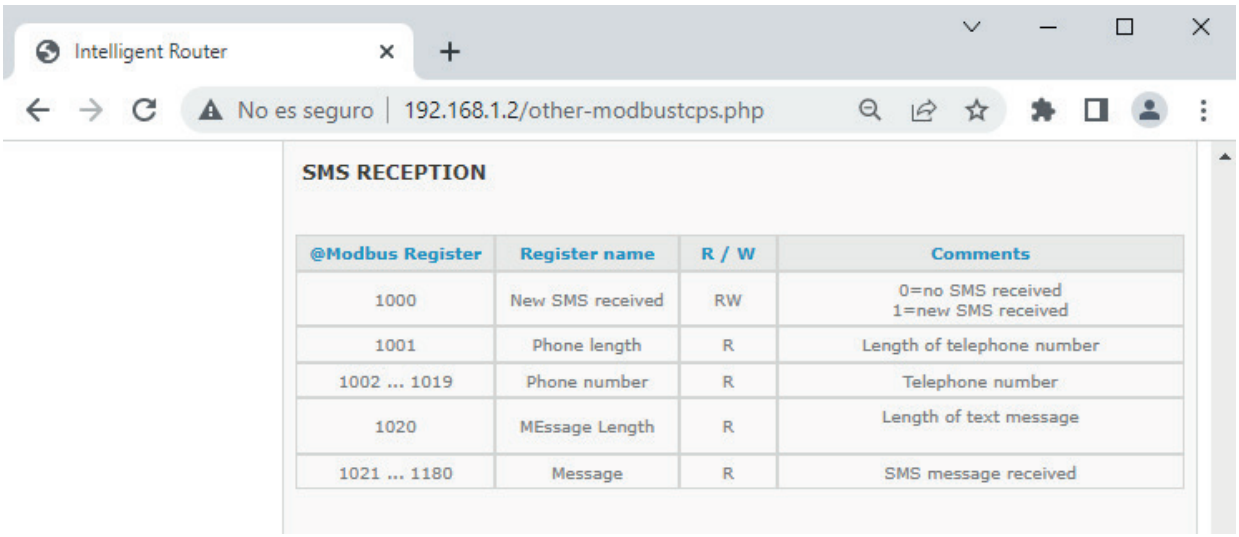
5. Receiving an SMS Message Using Modbus TCP or RTU

Receiving an SMS via Modbus TCP or RTU is also a simple process. Both the PLC acting as the Modbus TCP Master and the one acting as the Modbus RTU Master must periodically poll register 1000 of the TITAN-based device. If register 1000 contains a "1", it means there is an SMS message pending to be read.

Next we will read register 1001, which indicates the length of the number of the phone that sent the SMS. To find out the phone number that sent the SMS, we must read positions 1002 to 1019.

To read the body of the SMS message, first we need to read its length, which is contained in register 1020. Now we can read the text of the message, which is located in positions 1021 to 1180.

Once the SMS has been read, we must write a “0” to register 1000. When said register contains “1” again, it indicates that a new SMS message has arrived.



@Modbus Register	Register name	R / W	Comments
1000	New SMS received	RW	0=no SMS received 1=new SMS received
1001	Phone length	R	Length of telephone number
1002 ... 1019	Phone number	R	Telephone number
1020	MEssage Length	R	Length of text message
1021 ... 1180	Message	R	SMS message received

6. Sending a TRAP Using Modbus TCP or RTU

The procedure to send an SNMP TRAP is exactly the same as sending an SMS, but instead of executing a command such as:

```
AT^MTXTUNNEL=SMS,681319891,ALARMA
```

We must execute a command as before (converting it to ASCII), but with a different format, such as:

```
AT^MTXTUNNEL=TRAP,.1.3.6.1.4.1.45711.1.1.11.1.1;myMessage;5
```

We just need to specify the OID (in this example “.1.3.6.1.4.1.45711.1.1.11.1.1”), one field for the text message and one field for the Severity (in this case “5”).

100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117
A	T	^	M	T	X	T	U	N	N	E	L	=	T	R	A	P	,
65	84	94	77	84	88	84	85	78	78	69	76	61	84	82	65	80	44

118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
.	1	.	3	.	6	.	1	.	4	.	1	.	4	5	7
46	49	46	51	46	54	46	49	46	52	46	49	46	52	53	55

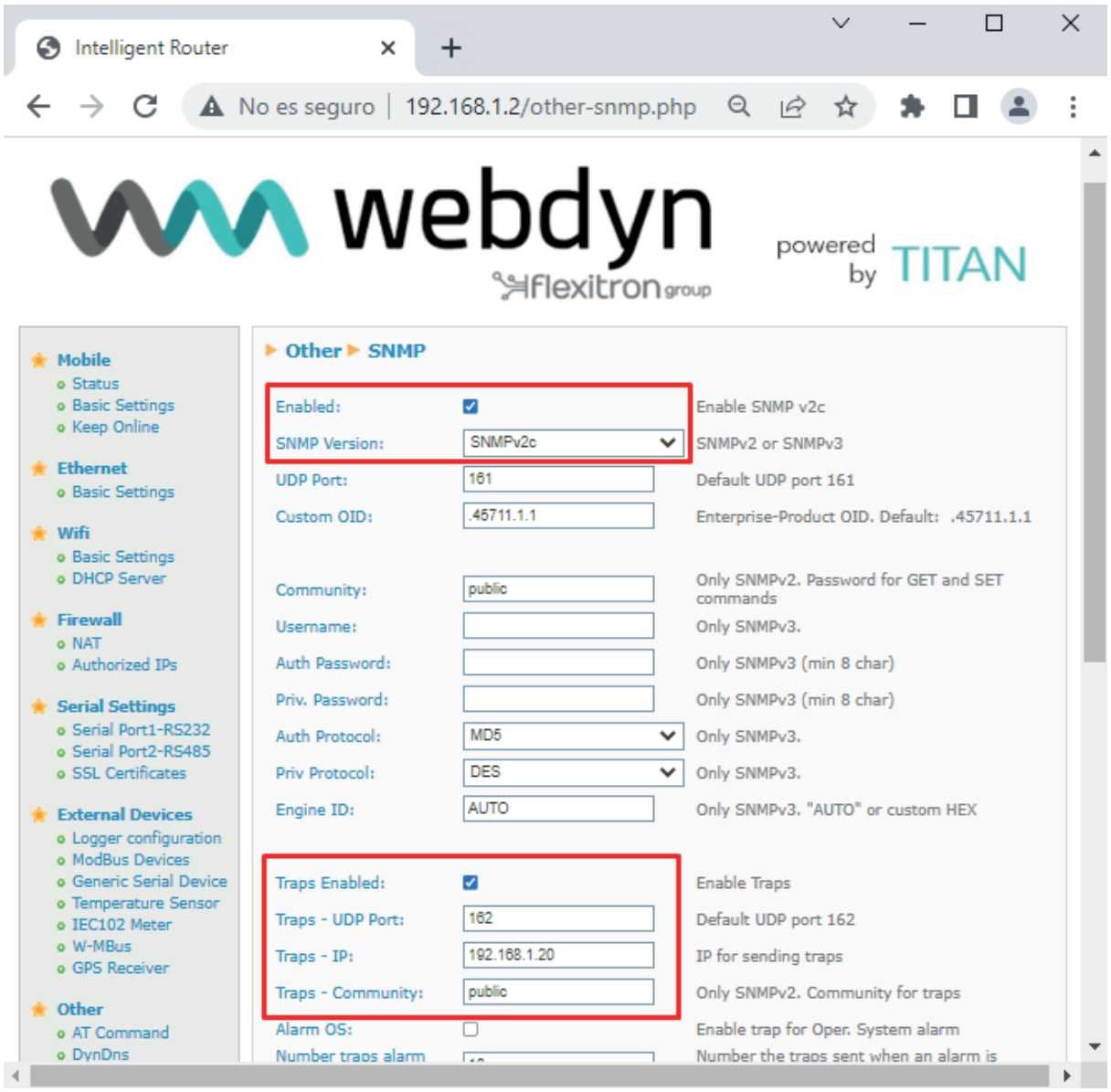
134	135	136	137	138	139	140	141	142	143	144	145	146	147
1	1	.	1	.	1	.	1	1	.	1	.	1	;
49	49	46	49	46	49	46	49	49	46	49	46	49	59

148	149	150	151	152	153	154	155	156	157	158
m	y	M	e	s	s	a	g	e	;	5
109	121	77	101	115	115	97	103	101	59	53

The response to the command should be treated in the same way as the SMS discussed earlier. If the response includes OK, it was executed correctly.

What IP is the TRAP sent to?

The TRAP is sent to the IP address of the port specified in the “Other > SNMP” configuration.



7. Sending an EMAIL via Modbus TCP or RTU

The procedure for sending an SNMP TRAP is exactly the same as for sending an SMS message, but instead of executing a command such as: AT^MTXTUNNEL=EMAIL,jgallego@matrix.es,ALARMA

In the current Firmware version of the TITAN device, an EMAIL can only be sent if you specify the destination address and the subject of the email. Remember that, before sending a message you must configure the TITAN-based device with the appropriate parameters for the SMTP server, this is done in the “Other > Email Configuration” section.