

devinet

Manual

Devicom™ Gateway

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Table of Contents

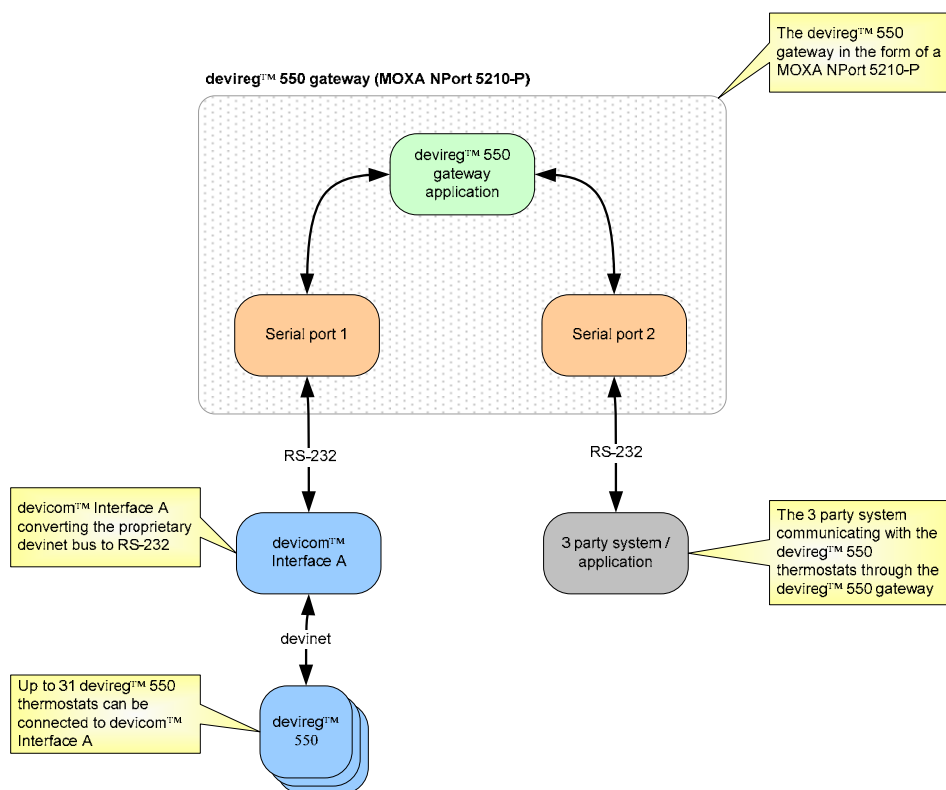
1	INTRODUCTION	1
1.1	System overview	1
1.2	Terms	1
2	THE GATEWAY	2
2.1	Connecting devicom™ Interface A	2
2.2	Connecting the 3 party system	3
2.3	LED's	4
3	CONFIGURING DEVIREG™ 550 NETWORK	5
4	GATEWAY PROTOCOL	6
4.1	In general	6
4.2	Format	7
4.2.1	Example telegram without data	8
4.2.2	Example telegram with data	9
5	GATEWAY PROTOCOL COMMANDS	11
5.1	Standard DP10	11
5.1.1	Get main firmware	11
5.2	Gateway specific	12
5.2.1	Get devireg™ 550 thermostat list	12
5.2.2	Get devireg™ 550 status	13
5.2.3	Get devireg™ 550 timer setback	16
5.2.4	Set devireg™ 550 mode and set point	18
5.2.5	Set devireg™ 550 timer setback	20
5.2.6	Set devireg™ 550 thermostat lock	22
5.2.7	Set devireg™ 550 watch	23
5.2.8	Return codes	24
5.3	Command overview	25
6	USING THE GATEWAY PROTOCOL	26
7	CONTACT INFORMATION	30

1 INTRODUCTION

1.1 System overview

The Devicom™ Gateway consists of an MOXA NPort 5210-P Programmable Communication Gateway. The Devicom™ Gateway handles communication with the devireg™ 550 thermostats and offers an easy to use ASCII based protocol for communication with the devireg™ 550 thermostats.

The diagram below shows where the Devicom™ Gateway fits.



1.2 Terms

The terms listed below are used in this manual:

- **Gateway**
The Devicom™ Gateway in the form of a MOXA NPort 5210-P Programmable Communication Gateway.
- **Application**
Short for the 3 party system communicating with the devireg™ 550 thermostats through the Devicom™ Gateway.
- **Telegram**
A complete request or response between the application and the gateway.

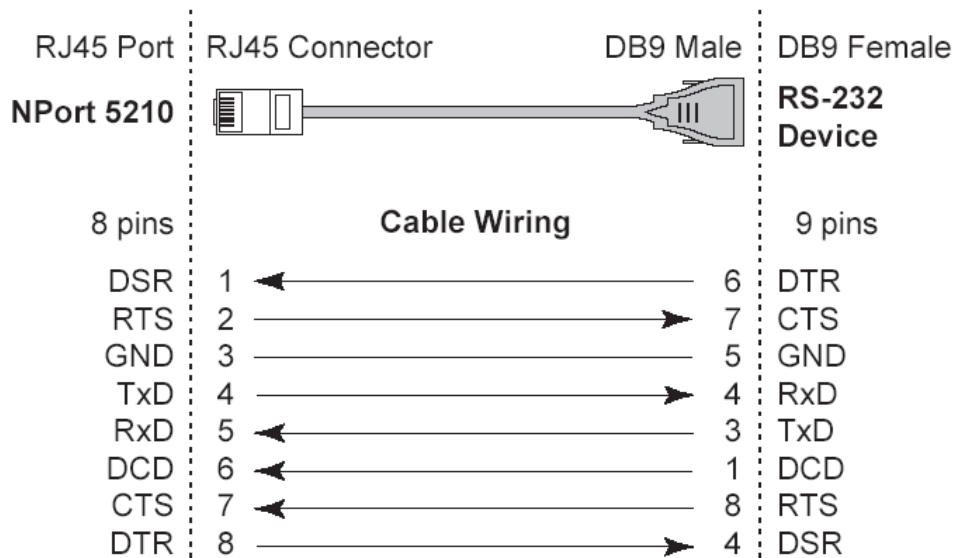
2 THE GATEWAY

2.1 Connecting devicom™ Interface A

The devicom™ Interface A must be connected to RS-232 port 1 on the gateway. A RS-232 cable with a DB-9 male connector is delivered with the gateway for this purpose.

Important: To ensure proper operation of devicom™ Interface A supply external power to the interface.

MOXA's cable name is CBL-RJ45M9-150. The cable wiring is shown below:



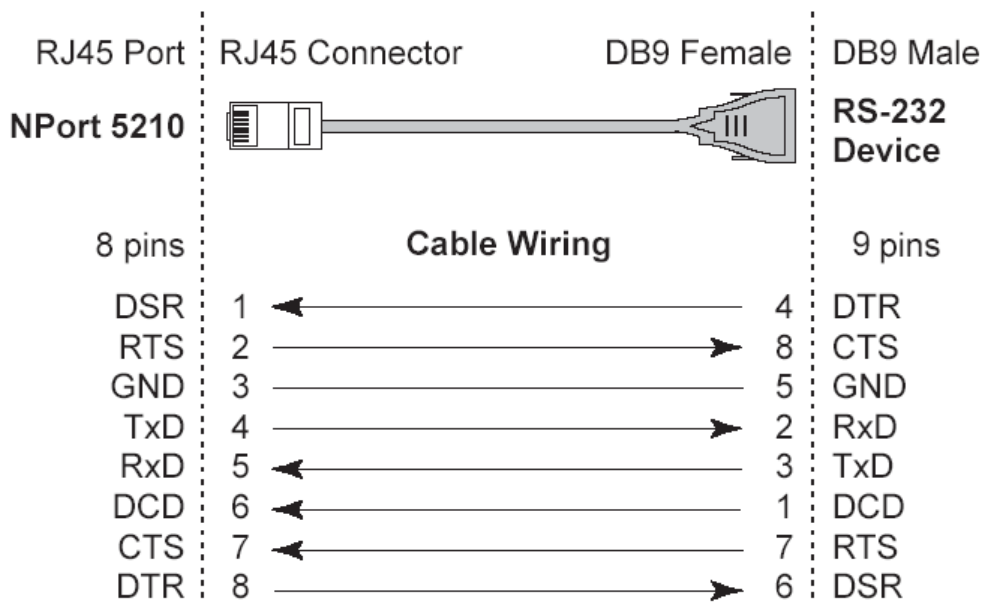
2.2 Connecting the 3 party system

The 3 party system must be connected to RS-232 port 2 on the gateway. A RS-232 cable with a DB-9 female connector is delivered with the gateway for this purpose.

The serial settings on the gateway are shown below:

Baud rate : 38400
 Data bits : 8
 Stop bits : 1
 Parity : even
 Handshake : none

MOXA's cable name is CBL-RJ45F9-150 . The cable wiring is shown below:



2.3 LED's

There are 4 four LED's located on the front of the gateway (MOXA NPort 5210-P):

- **Ready**
The Ready LED is used to display status and errors detected by the gateway. See below for more information about this LED.
- **Link**
The Link LED displays status about the Ethernet port. The Ethernet port is not used on the gateway and the LED is therefore not explained any further.
- **P1 – RS-232 Port 1 status**
The P1 LED flashes when the gateway is communicating with devicom™ Interface A.
- **P2 – RS-232 Port 2 status**
The P2 LED flashes when an application is communicating with the gateway.

When the gateway is working properly and no errors has been detected the Ready LED will flash green.

If the Ready LED flashes red an error has been detected by the gateway. The number of 'OFF' flashes between the Ready LED is steady red for approximately 2 seconds equals one of the error numbers listed below:

Error number	Description
1	An error was detected on devicom™ Interface A. Replace devicom™ Interface A.
2	devicom™ Interface A is not connected. Make sure devicom™ Interface A is properly connected to RS-232 port 1 on the gateway and that external power has been supplied to devicom™ Interface A.
3	One or more devireg™ 550 thermostats are configured as devinet MASTER. Reconfigure the devireg™ 550 thermostats to ALONE. See section 3 for more information.
4	One or more devireg™ 550 thermostats are not communicating correctly. Verify that all devireg™ 550 thermostats are properly connected to the devinet. Notice: If a devireg™ 550 thermostat has been replaced reset the gateway by powering OFF and ON again. Otherwise the gateway will try to communicate with the 'missing' devireg™ 550 thermostat which will lower the communication speed significantly.
5	DP10 communication error. An application has sent an invalid DP10 telegram to the gateway. The error will be reset by the gateway after having received 10 valid DP10 telegrams in a row.
6	A devinet communication error occurred. This error can happen on devinet networks with many devireg™ 550 thermostats connected. The error will be reset by the gateway after having received 10 valid devinet telegrams in a row.

A lower error number has priority over a higher error number, hence if both error number 3 and 5 is detected by the gateway error number 3 will be on display.

3 CONFIGURING DEVIREG™ 550 NETWORK

When using the gateway all devireg™ 550 thermostats **must** be configured as ALONE on the devinet network. If the gateway detects a devireg™ 550 thermostat configured as MASTER an error will be displayed as noted in section 2.3.

Refer to the devireg™ 550 thermostat manual for information on how to configure a devireg™ 550 thermostat as ALONE on the network or follow the steps below:

- Hold down the knob on the devireg™ 550 until *COdE* is displayed.
- Turn the knob until *0044* is displayed and press the knob.
The devireg™ 550 is now in configuration mode.
- Turn the knob until *ALO* is displayed and press the knob.
- Press the knob repeatedly to leave configuration mode.

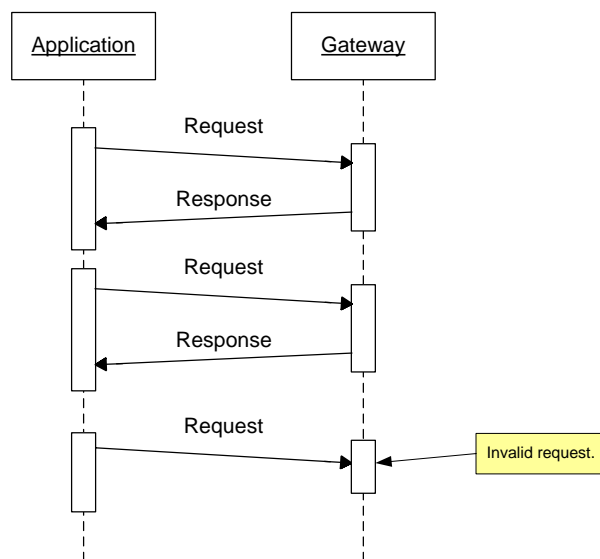
devicom™ PC•PRO can also be used to configure the network setting.

4 GATEWAY PROTOCOL

4.1 In general

The protocol used to communicate with the gateway is a standard DEVI protocol called DP10.

The protocol is build up around a request / response principle where the gateway is the slave. In other words the gateway will never send any data (response) to the application without first having received a request from the application.



If an invalid request is received by the gateway no response is send to the application as the above sequence diagram shows. An invalid request is for example a malformed request telegram (ex. an invalid checksum) or a telegram with an unsupported command.

The protocol is designed for a point-to-point scenario where one application communicates with one gateway, hence there is no node addressing to take care about.

As mentioned the term telegram is used to identify a complete request or response.

The protocol is ASCII based which makes is easy for an application to detect start and end of a telegram. A telegram always begins with ASCII character 0x02 (STX) and ends with ASCII character 0x03 (ETX). All characters between STX and ETX are guarantied to be in the range 0x20 to 0xFF, hence an application will always be able to synchronize reception of a telegram on STX and ETX.

4.2 Format

The table below shows the format of a DP10 protocol telegram:

Character index								
0	1	2	3	4	5 -> (5 + LEN)	5+LEN	6+LEN	7+LEN
Content								
STX	CMD	LEN	DATA _{0-LEN}		LRC		ETX	

- **STX**
Start of telegram. This character is always ASCII code 0x02.
- **CMD**
Two character hexadecimal telegram command. An even command is always a request and an odd command is always a response. The telegram command is used by the application to request different kinds of data from the gateway.
- **LEN**
Two character hexadecimal telegram data length. The data length equals the number of characters contained in the DATA part of the telegram. The data length can be in the range 0 to 255.
- **DATA**
Data part of the telegram. The number of characters in the data part is equal to LEN. Content of the data part is dependent on CMD.
- **LRC**
Two character hexadecimal telegram checksum. The checksum is calculated as $(\sum(\text{CMD} + \text{LEN} + \text{DATA}_{0-\text{LEN}}) \text{ AND } 0\text{xFF}) \text{ XOR } 0\text{xFF}$. For more information on how to calculate the checksum see the example telegrams in the next sections.
- **ETX**
End of telegram. This character is always ASCII code 0x03.

In the next sections two example telegrams are shown to give a 'hands-on' explanation of the telegram format.

4.2.1 Example telegram without data

The table below shows a complete telegram with CMD = 0x16 and LEN = 0x00 without DATA:

Character index								
0	1	2	3	4		5	6	7
Content								
STX	CMD		LEN		DATA	LRC		ETX
Hex value								
0x02	0x31	0x36	0x30	0x30		0x33	0x38	0x03
Decimal value								
2	49	54	48	48		51	56	3
ASCII								
STX	'1'	'6'	'0'	'0'		'3'	'8'	ETX

The complete telegram displayed as ASCII:

*STX*160038*ETX*

The checksum (LRC) is calculated as shown below:

Calculate sum by adding all hex values from character index 1 to 4:

$$\text{SUM} = \sum(\text{CMD} + \text{LEN} + \text{DATA}_{0-\text{LEN}}) = 0xC7$$

Truncate the sum to the least significant byte value:

$$\text{SUM} = \text{SUM AND } 0xFF = 0xC7 \text{ AND } 0xFF = 0xC7$$

Finally calculate the checksum:

$$\text{LRC} = \text{SUM XOR } 0xFF = 0xC7 \text{ XOR } 0xFF = 0x38$$

4.2.2 Example telegram with data

The table below shows a complete telegram with CMD = 0x20 and LEN = 0x08 with 8 DATA characters:

STX, CMD and LEN part of the telegram:

Character index				
0	1	2	3	4
Content				
STX	CMD		LEN	
Hex value				
0x02	0x32	0x30	0x30	0x38
Decimal value				
2	50	48	48	56
ASCII				
STX	'2'	'0'	'0'	'8'

DATA part of the telegram:

DATA character index							
5	6	7	8	9	10	11	12
DATA content fields							
DATA							
Hex value							
0x30	0x46	0x41	0x30	0x30	0x30	0x33	0x32
Decimal value							
48	70	65	48	48	48	51	50
ASCII							
'0'	'F'	'A'	'0'	'0'	'0'	'3'	'2'

LRC and ETX part of the telegram:

Character index		
13	14	15
Content		
LRC		ETX
Hex value		
0x38	0x39	0x03
Decimal value		
56	57	3
ASCII		
'8'	'9'	ETX

The complete telegram displayed as ASCII:

*STX*20080FA0003289*ETX*

The checksum (LRC) is calculated as shown below:

Calculate sum by adding all hex values from character index 1 to 12:

$$\text{SUM} = \sum(\text{CMD} + \text{LEN} + \text{DATA}_{0-\text{LEN}}) = 0x276$$

Truncate the sum to the least significant byte value:

$$\text{SUM} = \text{SUM AND } 0xFF = 0x276 \text{ AND } 0xFF = 0x76$$

Finally calculate the checksum:

$$\text{LRC} = \text{SUM XOR } 0xFF = 0x76 \text{ XOR } 0xFF = 0x89$$

5 GATEWAY PROTOCOL COMMANDS

5.1 Standard DP10

Standard DP10 commands lie in the range 0x00 to 0x9F.

5.1.1 Get main firmware

Get main firmware software number, hardware variant, version and revision.

5.1.1.1 Request

CMD: 0x16

DATA: none

Example request telegram:

[STX]1600[LRC][ETX]

5.1.1.2 Response

CMD: 0x17

DATA: status code, software number, hardware variant, version and revision.

Response DATA format:

DATA character index											
0	1	2	3	4	5	6	7	8	9	10	11
DATA content fields											
SC	SN			HV	VER	`.'		REV			

- **SC**
Status code. Always `0`.
- **SN**
Software number. `0000` to `9999`.
- **HV**
Hardware variant. `00` to `99`.
- **VER**
Gateway software version. `00` to `99`.
- **REV**
Gateway software revision. `00` to `99`.

5.2 Gateway specific

All gateway specific response telegrams returns a hexadecimal return code (the **RC** field) as the first two data characters. The return code must be treated as an unsigned byte, hence possible return code values are 0 to 255. See section 5.2.8 for a list of possible return codes.

Most of the gateway specific request and response telegrams uses an address to identify a specific devireg™ 550 thermostat (the **ADDR** field). The devireg™ 550 address is guaranteed to be unique because it is a unique ID stored in the devireg™ 550 thermostat during production at DEVI.

5.2.1 Get devireg™ 550 thermostat list

Get a list of connected devireg™ 550 thermostats.

Notice that it will take the gateway approximately 60 seconds after power up to scan the devinet network for devireg™ 550 thermostats.

5.2.1.1 Request

CMD: 0xA0
DATA: none

Example request telegram:

[STX]A000[LRC][ETX]

5.2.1.2 Response

CMD: 0xA1
DATA: Return code plus 0 to 31 devireg™ 550 addresses.

Response DATA format:

DATA character index									
0	1	2	3	4	5	6	7	8	9
DATA content fields									
RC		ADDR ₀₋₃₀							

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR₀₋₃₀**
8 character hexadecimal devireg™ 550 thermostat address list.

Each devireg™ 550 address is received as an 8 character long hexadecimal value. The number of devireg™ 550 thermostats connected to the gateway can be calculated as $(LEN - 2) / 8$. The application must be able to handle from 0 to 31 devireg™ 550 addresses.

Example response telegram containing two devireg™ 550 addresses:

[STX]A11200AA123456BB654321[LRC][ETX]

The first devireg™ 550 address is AA123456 and the second devireg™ 550 address is BB654321.

5.2.2 Get devireg™ 550 status

Get status for a specific devireg™ 550 thermostat.

5.2.2.1 Request

CMD: 0xA2

DATA: devireg™ 550 address

Request DATA format:

<i>DATA character index</i>							
0	1	2	3	4	5	6	7
<i>DATA content fields</i>							
ADDR							

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

Example request telegram:

[STX]A208AA123456[LRC][ETX]

The telegram above will request status from devireg™ 550 thermostat with address AA123456.

5.2.2.2 Response

CMD: 0xA3

DATA: Return code, devireg™ 550 address and status.

Response DATA format:

DATA character index																				
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DATA content fields																				
RC		ADDR						STQ		LTQ		SS		TM		TS				

DATA character index																	
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
DATA content fields																	
RT				FT				RS		AS		TL		VERSION			

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **STQ**
Two character hexadecimal short term quality in percent. If short term quality gets below 80% the devinet network is not working properly.
- **LTQ**
Two character hexadecimal long term quality in percent. Long term quality is an averaged value of short term quality. On a well working devinet network long term quality is above 95%.
- **SS**
Sensor setup. '0' = Room only, '1' = Room and floor, '2' = Floor only.
- **TM**
Thermostat mode. '0' = Timer, '1' = Manual, '2' = Frost protection, '3' = OFF.
- **TS**
Thermostat set point. See the table below for more information about this set point.
- **RT**
Current room temperature in the range -99.99 to 99.99 °C with a resolution of 1/100 °C.
DATA format: -99.99 °C is received as '-9999' and 99.99 °C is received as '+9999'.
- **FT**
Current floor temperature in the range -99.99 to 99.99 °C with a resolution of 1/100 °C.
DATA format: -99.99 °C is received as '-9999' and 99.99 °C is received as '+9999'.
- **RS**
Relay status. '0' = OFF, '1' = ON.
- **AS**
Alarm status. Two character hexadecimal value. See the table below for more information about alarm status.
- **TL**
Thermostat lock. '0' = thermostat NOT locked (knob enabled), '1' = thermostat locked (knob disabled).
Notice: The thermostat lock feature is only available with devireg™ 550 thermostat version 06.02 or later. The gateway will set TL to 'X' for old devireg™ 550 versions.
- **VERSION**
Four character devireg™ 550 version.
Example: For devireg™ 550 version 06.02 this field will contain '0602'.

The table below shows the DATA content fields returned as a function of the return code:

Field	Return code (RC)
RC	Always contained in the response.
ADDR	Always contained in the response. If RC_ILLEGAL_ADDRESS the ADDR field will contain the ADDR received in the request
STQ	RC_SUCCESS, RC_PENDING and RC_COMM_ERROR
LTQ	RC_SUCCESS, RC_PENDING and RC_COMM_ERROR
All fields	RC_SUCCESS

TS: Thermostat set point range and DATA format as a function of sensor setup and thermostat mode:

Sensor setup (SS)	Thermostat mode (TM)	Set point (TS)	DATA format
Room only or Room and floor	Timer	5.00 to 35.00 °C	'+0500' to '+3500'
Room only or Room and floor	Manual	5.00 to 35.00 °C	'+0500' to '+3500'
Room only or Room and floor	Frost protection	5.00 °C	'+0500'
Room only or Room and floor	OFF	0.00 °C	'+0000'
Floor only	Timer	1.00 to 10.00	'+0100' to '+1000'
Floor only	Manual	1.00 to 10.00	'+0100' to '+1000'
Floor only	Frost protection	1.00	'+0100'
Floor only	OFF	0.00	'+0000'

AS: Alarm status

Bit	Description	Error number on the devireg™ 550 display
0	Reserved, always 0	
1	Reserved, always 0	
2	Multi master	2
3	Slave not logged on	3
4	Overheat	4
5	Floor sensor short circuited	5
6	Floor sensor open circuited	6
7	Watch not valid	7

Alarm status examples:

AS = 0x84 means that alarm 'Multi master' and 'Watch not valid' is active.

AS = 0x00 means that no alarm is active hence the thermostat is working properly.

Example response telegram:

```
[STX]A3270000098882646400+0630+2122+249700000602[LRC][ETX]
```

The example response is from devireg™ 550 with address 0x00098882, short and long term quality is both 100%, sensor setup is Room only, thermostat mode is Timer, set point is 6.30 °C, room temperature is 21.22 °C, floor temperature is 24.97 °C, relay status is OFF, alarm status is 0x00 (no alarm), thermostat lock is disabled and the devireg™ 550 version is 06.02.

5.2.3 Get devireg™ 550 timer setback

Get timer setback for a specific devireg™ 550 thermostat.

5.2.3.1 Request

CMD: 0xA4

DATA: devireg™ 550 address

Request DATA format:

<i>DATA character index</i>							
0	1	2	3	4	5	6	7
<i>DATA content fields</i>							
ADDR							

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

Example request telegram:

[STX]A408AA123456[LRC][ETX]

The telegram above will request timer setback from devireg™ 550 thermostat with address AA123456.

5.2.3.2 Response

CMD: 0xA5

DATA: Return code, devireg™ 550 address and timer setback data.

Response DATA format:

DATA character index																					
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
DATA content fields																					
RC		ADDR						HM_0000->0800				HM_0800->1600				HM_1600->2400					
Timer setback data for Monday																					

DATA character index									
22	23	24	25	...	78	79	80	81	
DATA content fields									
HM_0000->0800			...			HM_1600->2400			
Timer setback data for Tuesday				...		Timer setback data for Saturday			

DATA character index												
82	83	84	85	86	87	88	89	90	91	92	93	
DATA content fields												
HM_0000->0800				HM_0800->1600				HM_1600->2400				
Timer setback data for Sunday												

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **HM_0000->0800**
4 character hexadecimal value representing the time from 00:00 to 08:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 00:00 to 00:30 and bit₁₅ is the time from 07:30 to 08:00.
- **HM_0800->1600**
4 character hexadecimal value representing the time from 08:00 to 16:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 08:00 to 08:30 and bit₁₅ is the time from 15:30 to 16:00.
- **HM_1600->2400**
4 character hexadecimal value representing the time from 16:00 to 24:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 16:00 to 16:30 and bit₁₅ is the time from 23:30 to 24:00.

When a bit is set (binary 1) timer setback is inactive (temperature NOT lowered) for the half hour represented by the bit.

The RC and ADDR fields are always contained in the response. All other fields are only contained in the response when RC equals RC_SUCCESS.

5.2.4 Set devireg™ 550 mode and set point

Set devireg™ 550 thermostat mode and set point.

After setting thermostat mode and set point the new thermostat mode and set point values can be read back immediately from the gateway. It may take some time before the new thermostat mode and set point values reaches the devireg™ 550 thermostat.

5.2.4.1 Request

CMD: 0xC0

DATA: devireg™ 550 address, thermostat mode and set point.

Request DATA format:

DATA character index													
0	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA content fields													
ADDR								TM	TS				

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **TM**
Thermostat mode. '0' = Timer, '1' = Manual, '2' = Frost protection, '3' = OFF.
- **TS**
Thermostat set point. See the table below for more information about this set point.

TS: Thermostat set point range and DATA format as a function of sensor setup and thermostat mode:

Sensor setup (SS)	Thermostat mode (TM)	Set point (TS)	DATA format
Room only or Room and floor	Timer	5.00 to 35.00 °C	'+0500' to '+3500'
Room only or Room and floor	Manual	5.00 to 35.00 °C	'+0500' to '+3500'
Room only or Room and floor	Frost protection	Not used	'XXXXX'
Room only or Room and floor	OFF	Not used	'XXXXX'
Floor only	Timer	1.00 to 10.00	'+0100' to '+1000'
Floor only	Manual	1.00 to 10.00	'+0100' to '+1000'
Floor only	Frost protection	Not used	'XXXXX'
Floor only	OFF	Not used	'XXXXX'

Example request telegrams:

```
[STX]C00EAA1234560+2210[LRC][ETX]
```

The telegram above will set mode to timer and set point to 22.10 °C on the devireg™ 550 thermostat with address AA123456 with sensor setup room or room and floor.

```
[STX]C00EAA1234563XXXXX[LRC][ETX]
```

The telegram above will set mode to OFF on the devireg™ 550 thermostat with address AA123456.

```
[STX]C009AA1234562[LRC][ETX]
```

The telegram above will set mode to Frost protection on the devireg™ 550 thermostat with address AA123456. Notice that it is legal to omit field TS when setting mode to Frost protection or OFF.

5.2.4.2 Response

CMD: 0xC1

DATA: Return code and devireg™ 550 address.

Response DATA format:

<i>DATA character index</i>									
0	1	2	3	4	5	6	7	8	9
<i>DATA content fields</i>									
RC		ADDR							

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

The RC and ADDR field are always contained in the response.

5.2.5 Set devireg™ 550 timer setback

Set devireg™ 550 timer setback for an entire week on a specific thermostat or all connected thermostats by using the broadcast address. Monday is represented as day 1 on the devireg™ 550 thermostat.

After setting timer setback the new timer setback data can be read back immediately from the gateway. It may take some time before the new timer setback data reaches the devireg™ 550 thermostat, especially when using the broadcast address.

5.2.5.1 Request

CMD: 0xC2

DATA: devireg™ 550 address or broadcast address 0xFFFFFFFF and timer setback data.

Request DATA format:

DATA character index																			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DATA content fields																			
ADDR								HM_0000->0800				HM_0800->1600				HM_1600->2400			
Timer setback data for Monday																			

DATA character index								
20	21	22	23	...	76	77	78	79
DATA content fields								
HM_0000->0800				...		HM_1600->2400		
Timer setback data for Tuesday begin				...		Timer setback data for Saturday end		

DATA character index											
80	81	82	83	84	85	86	87	88	89	90	91
DATA content fields											
HM_0000->0800				HM_0800->1600				HM_1600->2400			
Timer setback data for Sunday											

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **HM_0000->0800**
4 character hexadecimal value representing the time from 00:00 to 08:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 00:00 to 00:30 and bit₁₅ is the time from 07:30 to 08:00.
- **HM_0800->1600**
4 character hexadecimal value representing the time from 08:00 to 16:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 08:00 to 08:30 and bit₁₅ is the time from 15:30 to 16:00.
- **HM_1600->2400**
4 character hexadecimal value representing the time from 16:00 to 24:00. Each bit in the 16 bit value represents half an hour. Bit₀ is the time from 16:00 to 16:30 and bit₁₅ is the time from 23:30 to 24:00.

When a bit is set (binary 1) timer setback is inactive (temperature NOT lowered) for the half hour represented by the bit.

5.2.5.2 Response

CMD: 0xC3

DATA: Return code and devireg™ 550 address.

Response DATA format:

<i>DATA character index</i>									
0	1	2	3	4	5	6	7	8	9
<i>DATA content fields</i>									
RC		ADDR							

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

The RC and ADDR fields are always contained in the response.

5.2.6 Set devireg™ 550 thermostat lock

Set devireg™ 550 thermostat lock on a specific thermostat or all connected thermostats by using the broadcast address. If the thermostat is locked the knob on the devireg™ 550 thermostat is disabled.

After setting thermostat lock the new thermostat lock state can be read back immediately from the gateway. It may take some time before the new state reaches the devireg™ 550 thermostat, especially when using the broadcast address.

Notice: Thermostat lock is only available with devireg™ 550 thermostat version 06.02 or later. The gateway will respond with RC = RC_NOT_SUPPORTED for old devireg™ 550 versions. When using the broadcast address the gateway will NOT respond with RC_NOT_SUPPORTED if one or more of the connected devireg™ 550 thermostats is older than version 06.02.

5.2.6.1 Request

CMD: 0xC4

DATA: devireg™ 550 address or broadcast address 0xFFFFFFFF and thermostat lock flag.

Request DATA format:

DATA character index								
0	1	2	3	4	5	6	7	8
DATA content fields								
ADDR								TL

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **TL**
Thermostat lock. '0' = thermostat NOT locked (knob enabled), '1' = thermostat locked (knob disabled).

5.2.6.2 Response

CMD: 0xC5

DATA: Return code and devireg™ 550 address.

Response DATA format:

DATA character index									
0	1	2	3	4	5	6	7	8	9
DATA content fields									
RC	ADDR								

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

The RC and ADDR fields are always contained in the response.

5.2.7 Set devireg™ 550 watch

Set devireg™ 550 watch on a specific thermostat or all connected thermostats by using the broadcast address. The watch cannot be read from the thermostat.

Hint: To ensure that the devireg™ 550 watch is correct it is a good idea to set the devireg™ 550 watch on a regular basis, for example once a day.

5.2.7.1 Request

CMD: 0xC6

DATA: devireg™ 550 address or broadcast address 0xFFFFFFFF and date / time.

Request DATA format:

DATA character index																					
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
DATA content fields																					
ADDR								YEAR				MON		DAY		HOUR		MIN		SEC	

- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.
- **YEAR**
4 character decimal year in the range 2006 to 2099.
- **MON**
2 character decimal month in the range 1 to 12.
- **DAY**
2 character decimal day of month in the range 1 to 31 (upper range depends on the month).
- **HOUR**
2 character decimal hour in the range 0 to 23.
- **MIN**
2 character decimal minutes in the range 0 to 59.
- **SEC**
2 character decimal seconds in the range 0 to 59.

Example request telegrams:

[STX]C616AA12345620060331225033[LRC][ETX]

The telegram above will set date to the 31 marts 2006 and time to 22:50:33 on the devireg™ 550 thermostat with address AA123456.

5.2.7.2 Response

CMD: 0xC7

DATA: Return code and devireg™ 550 address.

Response DATA format:

DATA character index									
0	1	2	3	4	5	6	7	8	9
DATA content fields									
RC		ADDR							

- **RC**
Two character hexadecimal return code. See section 5.2.8 for a list of possible return codes.
- **ADDR**
8 character hexadecimal devireg™ 550 thermostat address.

The RC and ADDR fields are always contained in the response.

5.2.8 Return codes

The table below lists all possible return codes

Return code	Value	Description
RC_SUCCESS	0	Success
RC_PENDING	1	All devireg™ 550 values are not available in the gateway. Try again later.
RC_COMM_ERROR	2	The gateway is unable to communicate with the devireg™ 550 thermostat.
RC_NOT_SUPPORTED	3	Not supported by the devireg™ 550 thermostat.
RC_INVALID_ADDRESS	4	Invalid ADDR format.
RC_INVALID_DATA	5	Invalid DATA format.
RC_UNKNOWN_ADDRESS	6	Unknown devireg™ 550 address.
RC_BROADCAST_NOT_POSSIBLE	7	Use of the broadcast address is not possible with this command.
RC_INTERFACE_A_MISSING	8	devicom™ Interface A is not connected.
RC_INTERFACE_A_POWER	9	devicom™ Interface A power failure. Apply external power to devicom™ Interface A.
RC_FATAL_ERROR	255	A fatal internal error occurred.

5.3 Command overview

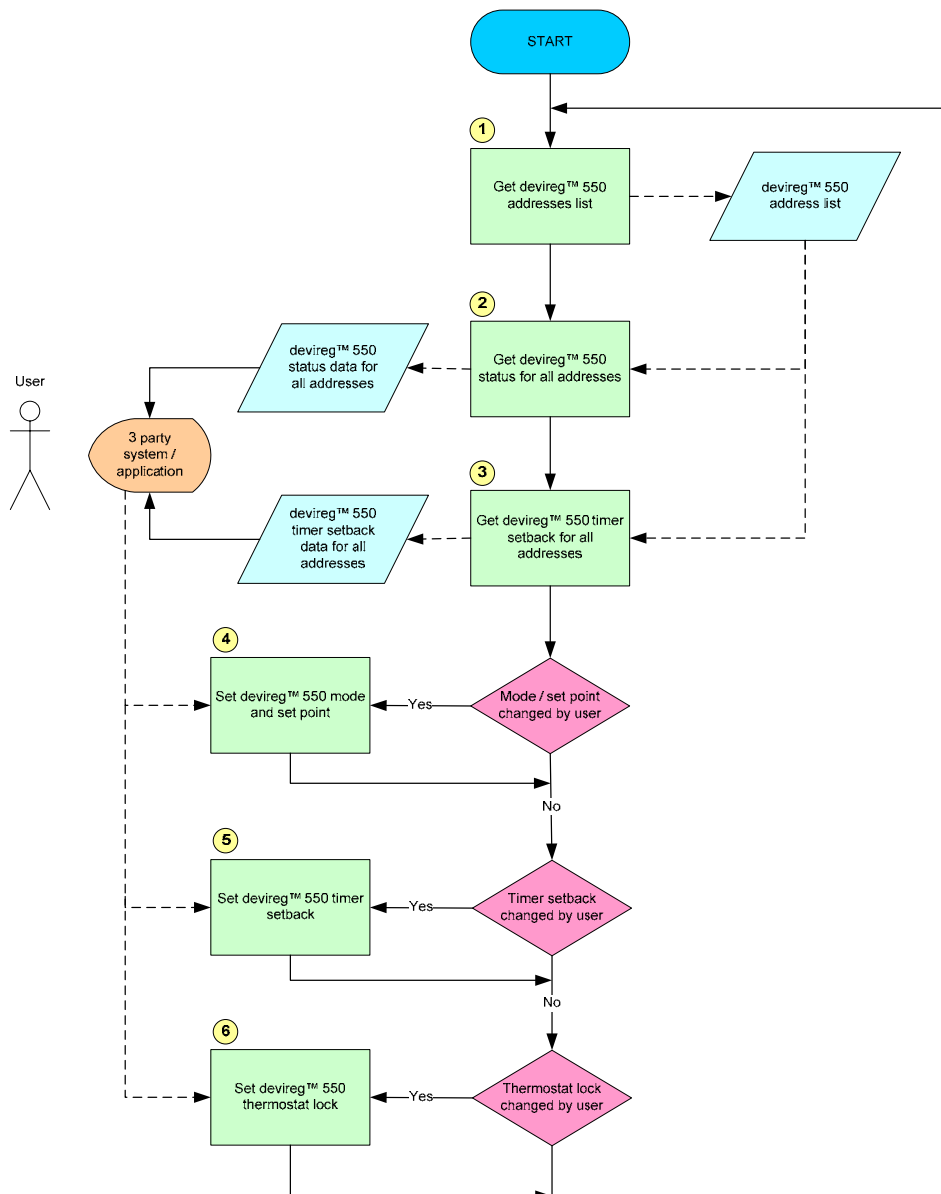
The table below list all commands supported by the gateway. Commands below 0xA0 are standard DP10 protocol commands and are in general not of interest to an application.

Notice that a commands send by the application (request) always has an even command number and commands send by the gateway (response) always has an odd command number. Furthermore the response command is always the request command plus one.

CMD	Description
0x16	Main firmware request
0x17	Main firmware response
0xA0	Get devireg™ 550 thermostat list request
0xA1	Get devireg™ 550 thermostat list response
0xA2	Get devireg™ 550 thermostat status request
0xA3	Get devireg™ 550 thermostat status response
0xA4	Get devireg™ 550 thermostat timer setback request
0xA5	Get devireg™ 550 thermostat timer setback response
0xC0	Set devireg™ 550 thermostat mode and set point request
0xC1	Set devireg™ 550 thermostat mode and set point response
0xC2	Set devireg™ 550 thermostat timer setback request
0xC3	Set devireg™ 550 thermostat timer setback response
0xC4	Set devireg™ 550 thermostat lock request
0xC5	Set devireg™ 550 thermostat lock response
0xC6	Set devireg™ 550 thermostat watch request
0xC7	Set devireg™ 550 thermostat watch response

6 USING THE GATEWAY PROTOCOL

Now that we have the gateway protocol in place it's time to actually use it. The flowchart below shows how a typical application should communicate with the gateway:



As the flowchart shows the application steps are:

1. Get the devireg™ 550 thermostat address list using DP10 command 0xA0.
2. Get status for all devireg™ 550 thermostats in the address list using DP10 command 0xA2.
3. Get timer setback for all devireg™ 550 thermostats in the address list using DP10 command 0xA4.
4. Set devireg™ 550 thermostat mode and set point if changed by a user using DP10 command 0xC0.
5. Set devireg™ 550 thermostat timer setback if changed by a user using DP10 command 0xC2.
6. Set devireg™ 550 thermostat lock if changed by a user using DP10 command 0xC4.

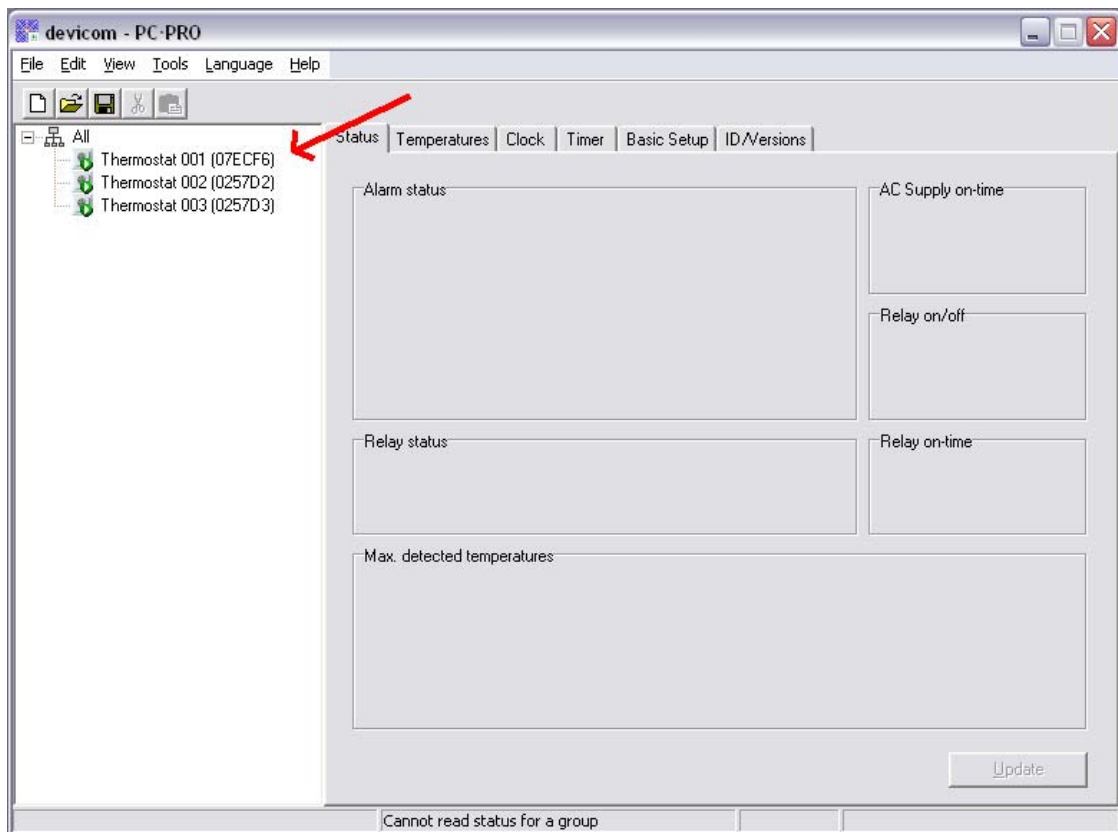
Apart from the above steps an application should use DP10 command 0xC6 to set the devireg™ 550 thermostat watch on power up and on a weekly basis.

Another way of using the gateway protocol is to hard-code the list of devireg™ 550 thermostat addresses into the application, remembering that a devireg™ 550 thermostat address will never change.

To initially get the devireg™ 550 thermostat list devicom™ PC•PRO can be used by following the steps below:

- Install PC•PRO on a PC
- Connect devicom™ Interface A directly to the PC.
- Choose the menu File / New

PC•PRO will then scan the network for devireg™ 550 thermostats and display them in the tree view as shown below:

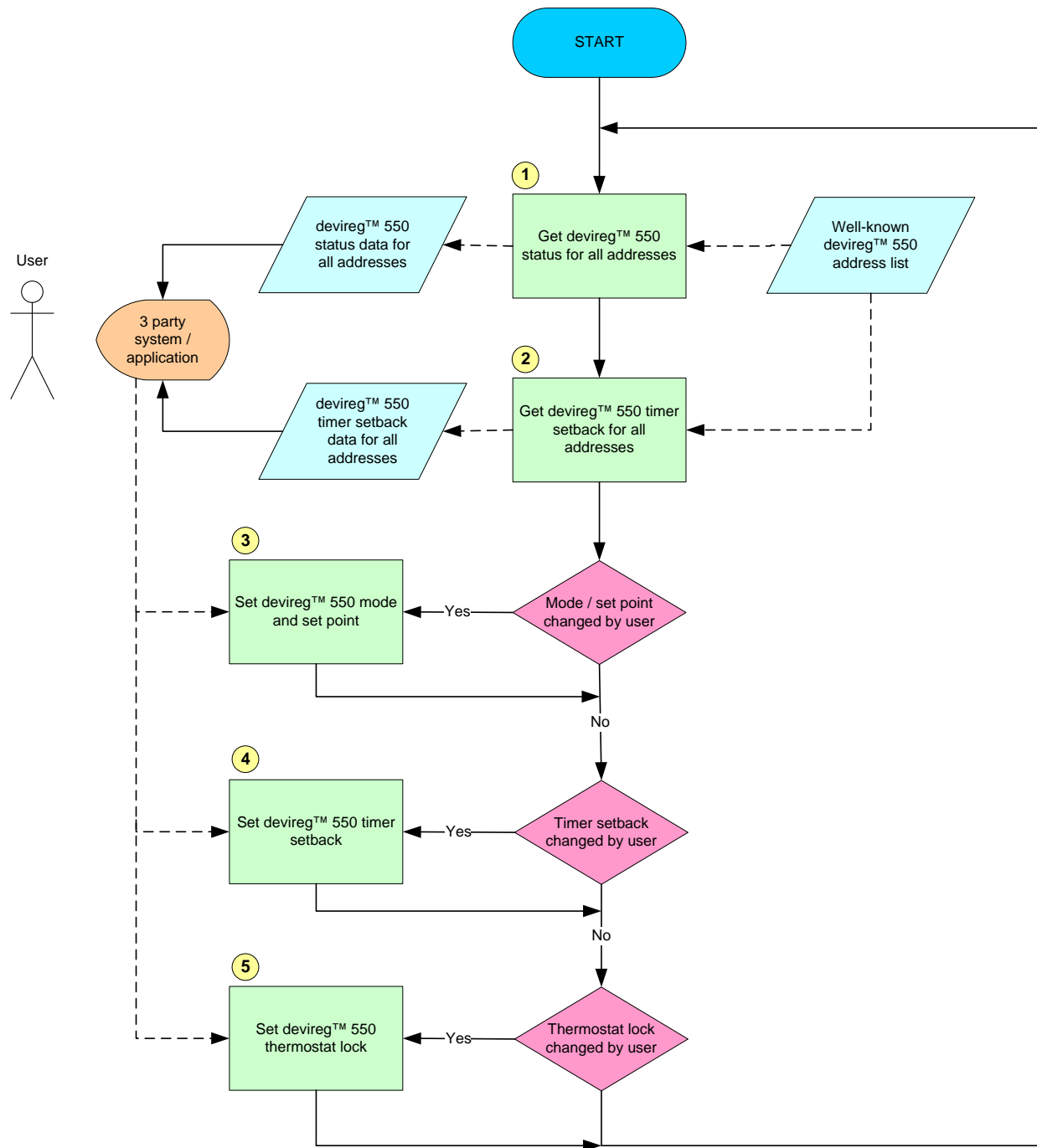


The hexadecimal number displayed next to the 'Thermostat XXX' text is the last 6 characters of the address used by the gateway. To convert a PC•PRO address to a gateway address simply prefix the address with '00'.

Hence the above three PC•PRO addresses will in gateway context be 0007ECF6, 000257D2 and 000257D3.

It is also a good idea to use PC•PRO to identify where the devireg™ 550 thermostats are located; bath room, living room etc. and write it down for later reference. Another way of identifying the devireg™ 550 thermostats are to adjust them to different set point, then use the DP10 command 0xA2 to get the set point and thereby identify the devireg™ 550 thermostats.

When using the “PC•PRO” approach for getting the devireg™ 550 address list a typical application should communicate with the gateway as shown on the flowchart below:



As the flowchart shows the application steps are:

1. Get status for all devireg™ 550 thermostats in the well-known address list using DP10 command 0xA2.
2. Get timer setback for all devireg™ 550 thermostats in the well-known address list using DP10 command 0xA4.
3. Set devireg™ 550 thermostat mode and set point if changed by a user using DP10 command 0xC0.
4. Set devireg™ 550 thermostat timer setback if changed by a user using DP10 command 0xC2.
5. Set devireg™ 550 thermostat lock if changed by a user using DP10 command 0xC4.

7 CONTACT INFORMATION

For further information please contact:

DEVI A/S
Ulvehavevej 61
7100 Vejle
Denmark
www.devi.com