

SIEMENS



SAPHIR BACnet via the RCC Card (ACX52.22) IV Produkt LB20 Application v4x

Engineering Guide

Contents

1	About this Document.....	5
1.1	Foreword.....	5
1.2	Notes on Use	5
1.3	Symbols and Abbreviations	5
1.4	Revision History	5
2	RCC Communication card	6
2.1	What is RCC?	6
2.2	Mounting	6
2.3	TCP/IP Communication	7
2.3.1	IP address assignment	7
2.3.2	Connection of TCP/IP	7
2.3.3	Name resolution (WINS)	7
2.3.4	Connecting to the Web/FTP server via Internet Explorer	8
2.3.5	Update the RCC communication card	8
2.4	BACnet/IP	8
2.4.1	BACnet/IP networks and addressing	8
2.4.2	BACnet Broadcast Management Devices (BBMDs)	9
2.4.3	Foreign devices.....	10
2.5	Limitations of BACnet/IP	11
2.6	Troubleshooting	11
2.7	BACnet server functionality.....	12
2.7.1	BACnet objects	12
2.7.2	Alarm handling	12
2.7.3	Time schedule, Calendar	13
3	Configuration.....	14
3.1	Configure the RCC card for BACnet	14
3.2	Configure the RCC card for BBMD	17
4	Integration	18
4.1	General	18
4.2	Using EDE files	18
5	BACnet Object types and members.....	20
5.1.1	General	20
5.1.2	Setpoint: Real	20
5.1.3	Setpoint: Enum	20
5.1.4	Messure (Analog input)	20
5.1.5	PosCommand (Analog output).....	21
5.1.6	Message (Alarms).....	21

5.1.7	SwitchCommand (Digital outputs).....	21
5.1.8	Counter	21
5.1.9	Time Schedule	21
5.1.10	Calendar.....	22
6	BACnet tag translation	23
6.1	Air Handling Units	23
6.1.1	Setpoints, Temperature.....	23
6.1.2	Setpoints, Pressure / Flow	23
6.1.3	Setpoints, Others	23
6.1.4	General settings / values.....	23
6.1.5	Temperature.....	24
6.1.6	Pressure / Flow	24
6.1.7	Analog Inputs, Others	24
6.1.8	Analog Outputs	25
6.1.9	Digital Outputs.....	25
6.1.10	Digital Inputs	25
6.1.11	Alarms	25
6.1.12	Alarm delay time	26
6.1.13	Operating hours count.....	26
6.1.14	Actual Operation mode / Setpoints	26
6.1.15	Operation mode control.....	26
6.1.16	Time shedule.....	27
6.1.17	General	27

1 About this Document

1.1 Foreword

Purpose

The purpose of this document is to provide users with a quick and simple means to familiarize themselves with the configuration of BACnet and use of the RCC card. The communication card ACX52.22 is used by the ACX32 and ACX34 controller.

1.2 Notes on Use

Target audience

This document is intended for developers who perform commissioning of the RCC card. For operation and planning of the SAPHIR OEM primary controller, please refer to additional documents, such as:

Further information

- SAPHIR ACX32..., Device Datasheet (Order No: CE2Q3689en)
- SAPHIR ACX34..., Device Datasheet (Order No: CE2Q3227en)
- SAPHIR ACX52.22, Device Datasheet (Order No: CE2Q3679en))

You can order this and other publications from Siemens Building Technologies, HVAC Products.

1.3 Symbols and Abbreviations



Passages introduced by this symbol indicate a warning to help prevent incorrect operation.



Passages introduced by this symbol indicate that the text must be read with special attention.



Paragraphs with this symbol provide tips.

Abbreviations

Abbreviation	Description
RCC	Rainbow Communication Card
WINS	Windows Internet Naming Service
DHCP	Dynamic Host Configuration Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
MAC address	Media Access Control; globally unique, 32 bit "serial number" of the network card
VVS14.0	Valid Version Set
PICS	BACnet Protocol Implementation Conformance Statement

1.4 Revision History

Revision	Date	Author	Remark
1.0	2007-10-11	Michael Sjöberg	First release

2 RCC Communication card

2.1 What is RCC?

General

The RCC card is a communication card that can be used in conjunction with both SAPHIR primary controllers (ACX32 and ACX34) and contains among other things:

- Web server and FTP server
- BACnet server
- TCP/IP

The explanations provided in this document are generally based on the basic configuration of the RCC card.

The term basic configuration refers to the as-delivered state of the ACX52.22 RCC card.



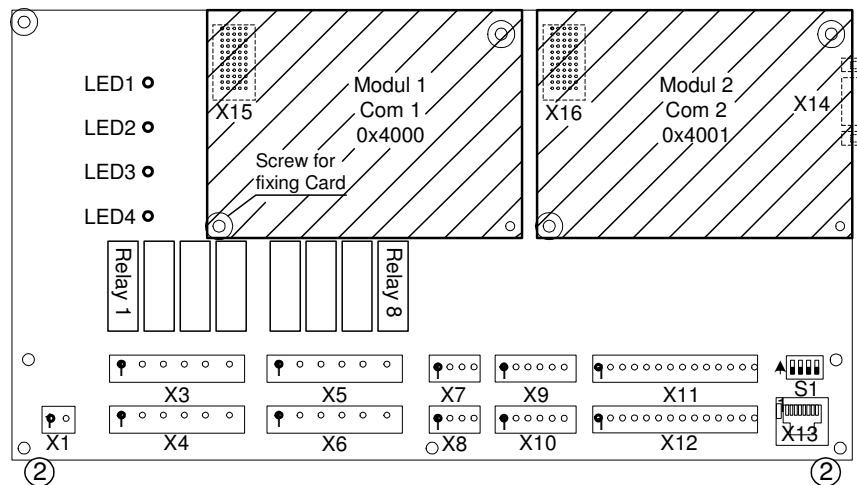
All information refers to WINDOWS CE image RCCV2_VVS14.0 or higher and are also required for BACnet communication.



The VVS14.0 RCC card requires the OS3.0 operating system or higher on the SAPHIR side (see SAPHIR documentation) and OS6.0 and higher if also the timescheduler will be used. **Note! RCC version VVS14.0 does not support BBMD.**

2.2 Mounting

Follow the instructions below for mounting the RCC card on the Saphir controller.



1. Power off.
2. Dismounting the two forward outside screws on cover with a screw-driver type Torx 10 or a flat chisel.
Note! Connect yourself to earth to avoid static electricity that could seriously damage the circuit card.
3. Mount metal fixing supports.
4. For ACX32, place the card with belonging cover plate in the "Com 1" slot. For ACX34, place the card with belonging cover plate in the "Com 2" slot.
5. Check that the card is correct connected.
6. Fix card with the screws that are in the kit.
7. Remount the Cover of the controller.
8. Power on.

2.3 TCP/IP Communication

2.3.1 IP address assignment

IP address assignment is either dynamic via DHCP server, or it can be manually preselected via HMI.

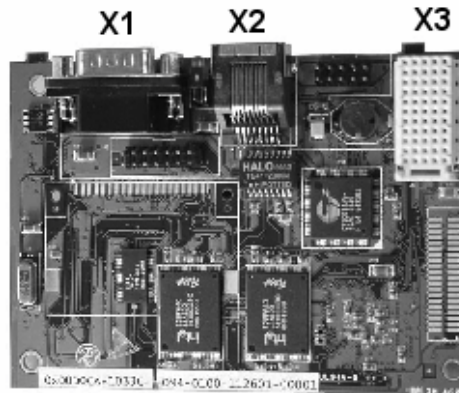
The present IP address can also be read via HMI.

Network

RCC must be properly logged on to the network, or the RCC card cannot be accessed via TCP/IP. Additionally, all network services, such as the integrated Web server or BACnet server, will not be accessible.

2.3.2 Connection of TCP/IP

Follow the instructions below to set up the TCP/IP connection.



1. Commissioning unit with all settings before starting to install TCP/IP.
2. Attach the network cable to connector X2.
3. Restart by switch off the power.
4. Log in with password (1000 or 2000).
Navigate to menu "Systemparameter – Communication – RCC-Configuration"
Here can the IP-address be read out or changed.
5. If a DHCP-server exist the given IP-address could be read.
6. If an own IP-address should be entered, then enter menu "Change IP"
Change "DHCP" to "Fixed". Then write the new address. To confirm new address change "apply" to "Yes".
7. **Restart by switch off the power or perform a software restart.**

2.3.3 Name resolution (WINS)

RCC can, however, log on to a WINS server if there is one present on the network. If logon is successful, the corresponding WINS name can be used to access the device from that time onwards.

You can easily determine the WINS name from the sticker on the card:

MAC address

- The top number on the sticker is the RCC's MAC address. It always has the form 00 A0 03 FF xxxx, where xxxx is a sequential number.
- The WINS name is made up of the prefix SBT_RCC_V2_ and xxxx (i.e. the last four digits of the MAC address).

Example:

The MAC Address on the sticker is 00 A0 03 FF 0AC1. Therefore, the resultant WINS name is SBT_RCC_V2_0AC1.

The WINS server should be able to resolve a 'ping' on the name, and it should display the present IP address.

2.3.4 Connecting to the Web/FTP server via Internet Explorer

Web server

To establish a successful connection to the Web server, use the WINS address or the IP address.

Example: "http://SBT_RCC_V2_0AC1/" or "http://146.253.69.197/"

FTP server

To establish a successful connection to the FTP server, use the same address as for the web server, but replace "http://" with "ftp://ADMIN@".

Example: "ftp://ADMIN@SBT_RCC_V2_0AC1/"

Password FTP Server

Log in with:

User name: ADMIN

Password: SBTAdmin!

The same password is also used for sysadmin.

2.3.5 Update the RCC communication card

Update RCC image

The RCC card can easily be updated with a new version if necessary, ex. if it is an already installed card with lower VVS. The new image is updated via the TCP/IP network by starting an exe file on a PC connected to the network and just type in the IP address or WINS name to the Saphir. After a restart the new image is active, but with factory settings, so all settings include the IP address must be set again.

2.4 BACnet/IP

2.4.1 BACnet/IP networks and addressing

BACnet/IP

A *BACnet/IP network* consists of one or more IP subnets assigned to the same BACnet network number. A *BACnet internetwork* consists of two or more BACnet networks. These networks may either be BACnet/IP networks, or they may be implemented with other BACnet data link protocols (e.g. BACnet/LON)

For BACnet/IP, the *BACnet MAC address* is 6 bytes long and consists of an IP address (4 bytes) and a UDP port number (2 bytes). The standard UDP port for BACnet communications is 0xBAC0 (in hexadecimal notation) or 47808 (in decimal notation). If two independent groups of BACnet devices are required to exist on one IP subnet, a different UDP port may be used for the second group. The range from 0xBAC1 to 0xBACF is not reserved, and should therefore be used with the appropriate caution

The various UDP ports of the BACnet devices can be thought of logically as different "wires". Only BACnet devices "connected to the same wire" can communicate with each other.

By using different UDP ports, it is possible to create several independent internetworks based on the same IT infrastructure. A management station can communicate simultaneously with several internetworks, enabling the user to operate the system without restrictions.

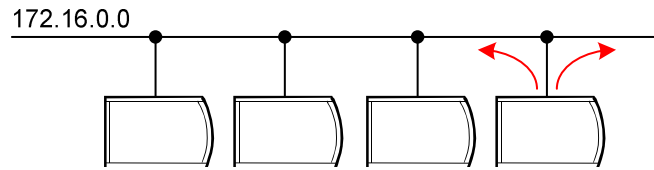
The use of several internetworks can be helpful in very large projects, for migration, and to encapsulate sections of plant with different reliability.

2.4.2 BACnet Broadcast Management Devices (BBMDs)

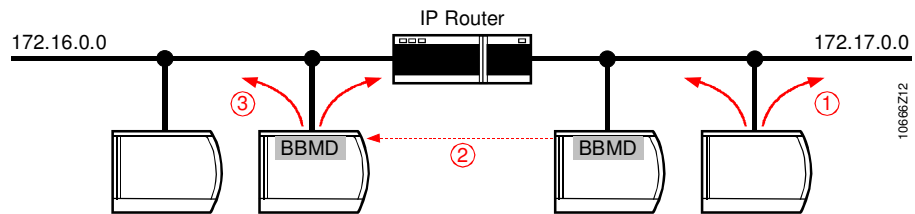
BBMD

The BACnet standard requires the Data Link Layer to receive broadcast datagrams from all BACnet devices in the BACnet network

In BACnet/IP networks consisting of only one IP subnet, this requirement is fulfilled without any additional work. The broadcast messages are transmitted as IP broadcasts (e.g. 172.16.255.255:0xBAC0).



If a BACnet/IP network is composed of several IP subnets, additional mechanisms are required to distribute the broadcasts. This is because IP broadcasts can only be transmitted to one subnet. For this purpose, BACnet defines the *BACnet Broadcast Management Device (BBMD)*. This is not really a separate product but, rather, an additional function of the BACnet devices.



BDT

BBMDs forward received broadcasts to all other BBMDs in the BACnet network, and these, in turn, transfer the broadcast to the local subnet. The table of all the BBMDs in a BACnet network is known as the *Broadcast Distribution Table (BDT)*. It consists of an entry for each IP subnet, comprising the IP address and UDP port of the BBMD, and a "Broadcast Distribution Mask". If the mask is 255.255.255.255, then the broadcast is transmitted to the relevant BBMD as a "unicast" message. The BBMD then places it on the local subnet. The procedure is referred to as "two-hop distribution" and is the "normal" case. If the IP routers are configured to forward broadcasts to remote subnets, the "one-hop distribution" method can be used. The BBMDs then send the broadcasts directly to the different IP subnets. In this process the subnet address is calculated on the basis of the Broadcast Distribution Mask

IP address	UDP port	Broadcast Distribution Mask	
172.16.0.1	0xBAC0	255.255.255.255	Two-hop distribution via BBMD → 172.16.0.1:0xBAC0
172.16.0.1	0xBAC0	255.255.0.0	One-hop distribution to IP subnet → 172.16.255.255:0xBAC0

The BDT is configured as a static table in the commissioning phase, and cannot be "learnt". It is identical for all the BBMDs of a BACnet/IP network. The maximum size of the BDT depends on the BBMD (product) in use, and must be determined by reference to the data sheet (PICS).

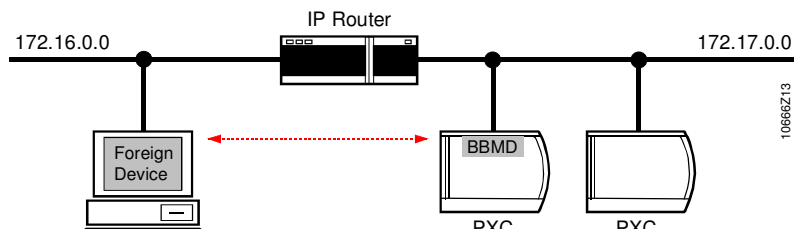
Rules

- In a BACnet/IP network consisting of more than one IP subnet, one BBMD must be defined in each subnet.
- In a BACnet/IP network consisting of one IP subnet only, no BBMD is required. However, if a BBMD exists, this does not cause any problems.
- BBMDs are grouped by BACnet/IP network. Communication between BBMDs in different BACnet networks is NOT permitted.
- Normally, the "two-hop distribution" method is used, as this works with all IP routers without the need for any further configuration.

2.4.3 Foreign devices

The way in which the BBMDs operate presupposes that all IP segments of the BACnet network are available at all times. The IP segments concerned carry the full BACnet broadcast load, even if there is only one BACnet device on an IP segment.

The *Foreign Device* is defined in BACnet to deal with this situation. As with the BBMD, this is not an actual product, but an additional function of an existing BACnet device.



Principle of operation

1. The foreign device registers itself with a BBMD for the receipt of broadcasts. The registration is accepted without any login mechanism, and must be renewed at regular intervals.
2. The BBMD enters the foreign device in the *Foreign Device table (FDT)*. The maximum size of the FDT depends on the BBMD in use, and must be determined by reference to the data sheet (PICS).
3. When it receives a broadcast, the local BBMD forwards it to all BBMDs in the BDT and to all foreign devices in the FDT.
4. Instead of transmitting broadcasts directly to the local subnet, the foreign device forwards the messages to the BBMD for distribution. Unicast messages, by contrast, are always delivered directly.
5. The foreign device de-registers from the BBMD and is removed from the FDT. If the foreign device fails to deregister, the entry is automatically deleted by the BBMD after a timeout, because the registration has not been renewed.

Registration with the BBMD involves the entry of an IP address and UDP port. A foreign device can therefore use any port number.

The registration process makes the foreign device a temporary member of the BACnet network. It is therefore required to comply with all the rules of the associated internetwork. In particular, the Device ID and Device Name of the foreign device must be unique within the internetwork.

2.5 Limitations of BACnet/IP

BACnet/IP is not compatible with all IT components. In such cases, either special configurations must be used or combinations involving these components must not be used. This manual is not handling such cases.

The dynamic allocation of addresses with DHCP can have undesirable effects on the system:

- DHCP must never be used with BBMDs, as the IP addresses in the BDT are configured as static addresses, and must therefore not change during operation.
- With BACnet, alarm recipients are entered with their device object identifier or BACnet address. The IP address is part of the BACnet address and must therefore not be changed for the alarm recipient. For this reason, the option involving the device object identifier must always be used.
- If access rights are assigned (e.g. for a firewall) on the basis of the IP address, this must be a static address.
- The BACnet standard currently supports only IP Version 4, which means that only IP nodes with a 32-bit address can be operated as BACnet/IP devices. The BACnet protocol does not yet handle the 128-bit addresses of IPv6.

2.6 Troubleshooting

All instructions is described in this document.

General Network

- The Saphir controller must be restarted after IP and BACnet configuration (hardware or software restart is possible).
- Fixed IP address must be used, change parameter DHCP to Fixed, change IP address, confirm by change “apply” to “Yes” and restart the controller.
- Try to ping the controller if the communication is not working. If the ping fails something is wrong in the network or the IP settings.
- Check that the defined UDP port is open in the firewall.

RCC version

- The RCC version has to be VVS14 or higher for BACnet to work.

Web pages

- If there is another start/front page than the default, it is probably a compact flash memory installed at the RCC card. Remove the memory or type in the direct address to the actual page.

BACnet

- If the EDE files are missing or Bacnet is not working, check if the BACnet server is running in the Process Manager (Web), BACnetserver.exe should be visible, otherwise start the BACnet server on the BACnet page.
- In case of using Cimetrics BACnet Explorer, check if BACstac service is running.
- If the BACnet client and the Saphir is on separate subnets, then BBMD must be used. This can be checked by using the “tracert” commando:
Ex. Command line: `tracert 172.16.87.12`
An external device with BBMD support must be used on the same subnet.
- Check that the Devicename and DeviceID is unique in the BACnet network.
- BACnet Multistate Objects do not use the value 0, it always starts with 1.

2.7 BACnet server functionality

BACnet server

The Saphir with RCC version VVS14 and higher supports the BACnet B-AAC standard.

2.7.1 BACnet objects

Mapped objects

Saphir object that are mapped to BACnet.

Saphir Object	BACnet Object	Comment
Clock	Device	
DeviceGroup	Device	
Measure/MeasureEX	AnalogInput	
PositioningCommand/EX	AnalogOutput	
SetpointReal	AnalogValue	No Alarm
LoopSetpoint	AnalogValue	
Counter	AnalogValue	
Unit	MultiStateOutput	
SwitchCommand	MultiStateOutput	
SetPointEnum	MultiStateValue	No Alarm
Message/MessageEX	BinaryInput	e.g Alarms
MessageClass	NotificationClass	
BACnet Scheduler	Schedule	
BACnet Calendar	Calendar	

Priorities

BACnet writable objects for example a SetpointReal, are set to UserAccess=Hand if they are written by BACnet. If no Priority in PriorityArray does have a valid value the UserAccess is set to Hand (just if BACnet operated). If UserAccess=Hand the BACnet property Out of service will be OutOfService=TRUE and Overriden=True.



Important! If UserAccess is set back to hand, then the object will take the default value.

When a BACnet operation is decline by the application, depending of the failure the write service will be declined or the value will not be assumed.

Multistate objects

BACnet does not use the value 0 for Multistate objects. All Multistate objects starts with 1. Saphir use Multistate objects even if there is only 2 switches (e.g Off/On).

2.7.2 Alarm handling

Alarm server

The alarm handling of a BACnet client is different to the alarm handling of Saphir.

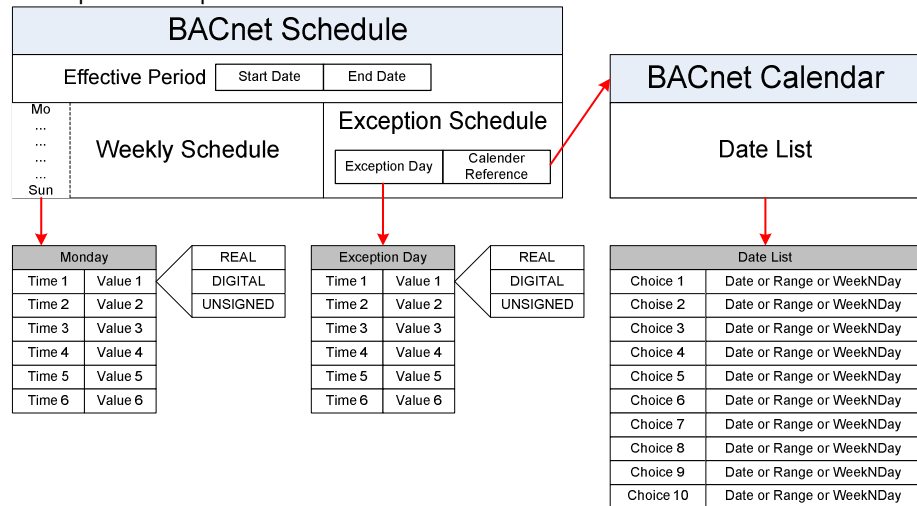
On BACnet is an acknowledge and reset, changeover ToNormal, ToOffNormal and ToFault, for a single BACnet object which is in alarm. The Saphir alarm handling just supports the changeover ToNormal. And this is done by a global acknowledge for every object and not for a single object which is in alarm.

Saphir objects do not support the changeover ToNormal, ToOffNormal and ToFault. What means that a acknowledge or reset on BACnet does not have any impact of a pending alarm on Saphir. An acknowledge on BACnet is for now simply a information that someone has seen the alarm. To reset a alarm from BACnet a workaround is required. An operational MultistateValue object called Reset is used to make the global acknowledge in the Saphir. This object sets to 1 and will automatically go back to 0.

2.7.3 Time schedule, Calendar

Concept

Concept of the Saphir time schedule for BACnet.



BACnet schedule

The Schedule Object includes a weekly schedule, a exception schedule (exception day) and a effective period which the Schedule is active.

Weekly schedule

Each day (Monday to Sunday) allows six different entries “time/value”. Depending on the Saphir Object which is connected to the schedule, the value will be REAL(FLOAT), DIGITAL or UNSIGNED (Multistate).

Exception schedule

The Exception Schedule is a List (Array) of Exception Days. Saphir has implemented only one Exception Day which refers to the BACnet Calendar object. The exception day is defined like a day out of the weekly schedule. The calendar object defines when the Exception Day is active and has the higher priority then the Weekly Schedule.

Calendar

The BACnet calendar is a list (array) of Date, Range, WeekNDay. If one choice is active, the exception day of connected BACnet Schedule is active.

Each choice can be defined as a Date, Range or WeekDay.

Date:

Date is defined with a (start)Date. Present Value is active for defined date.

Entry format: Day(Name), Year / Month / Day(Number)

Example:

Example: *,07/04/25 (the 25 of April 2007)

Example: Sun,*/04/25 (Every 25 of April if it is a Sunday)

Range:

Is a date range and defined with (start)Date and endDate. Present Value is active for defined period.

Entry format: Same format like for Date.

WeekDay:

Is a entry where it is possible to select a special day as a exception day.

Entry format: Week of month(Number), Day(Name), Month

Example:

Example: 02/Mo/Mar (The 2:nd Monday in Mars each year)

Example: */Tu* (Every Tuesday)

3 Configuration

3.1 Configure the RCC card for BACnet

The RCC-card has to be configured to handle BACnet communication. Follow the step-by-step instructions below to set up BACnet.

Step by step Instruction

1. Follow the instructions in chapter 2.2 and 2.3 to mount the RCC card and setup the TCP/IP address if it is not already done.
2. Ping the RCC card with the WINS or the IP address to test the communication.
(WinStart->Run->Open "CMD") C:\>ping sbt_rcc_v2_0AC1

Example:

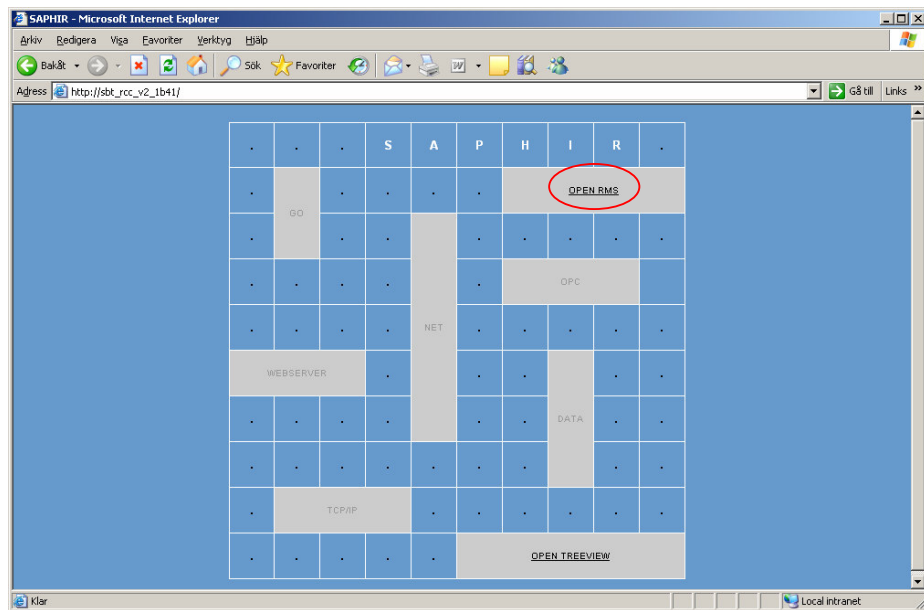
3. Connect to the Web server with the WINS or the IP address via Internet Explorer.
"http://SBT_RCC_V2_0AC1"

Example:

4. Click on the "Open RMS" link.
If the link is missing or there is a login page then fill in the "/rms/rms.html" in the address field.

Example:

"http://SBT_RCC_V2_0AC1/rms/rms.html"



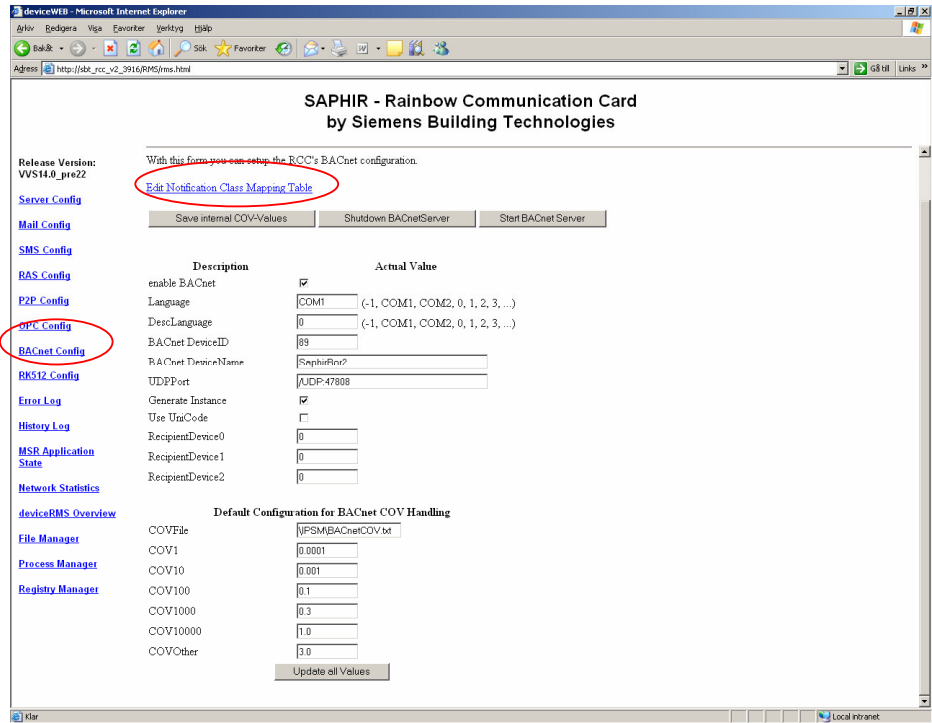
RCC Version

At the top to the right the actual version for the RCC card is shown. The version has to be VVS14 or higher for BACnet to work.

The RCC version can also be found in the Registry Manager, key:

HKEY_LOCAL_MACHINE\Ident

5. Click on the "BACnet config" link. The following window will appear.



- 6. - Set the "Enable BACnet" tic.
- Type COM1 (without space) at "Language"
- Define the description language number. All text will be same as in the HMI.

0	1	2	3	4	5	6	7
Swedish	English	Finnish	Polish	German	Danish	Magyar	Norwegian

- Define the "BACnet Device ID". Must be unique in the BACnet network.
- Define the "BACnet Device name". Must be unique in the BACnet network.
- Default UDP port for BACnet is 47808 (BAC0) but could be changed.
- Set the "Generate instance" tic, to have a unique object instance number.
- Define the BACnet addresses (DeviceID) for up to three Alarm recipients.
- Press the "Update All values" button.

7. Set up the "Notification Class Mapping Table".

Release Version:
VWS14.0_pre22

[Server Config](#)

[Mail Config](#)

[SMS Config](#)

[BAS Config](#)

[P2P Config](#)

[OPC Config](#)

[BACnet Config](#)

[BKS12 Config](#)

[Error Log](#)

SaphirMsgClass	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Notification Class ¹	11	21	31	41	4	12	22	32	42	13	23	33	43	14	24	34

Detailed Mapping

NClass Number ¹	Priority			Acknowledge Required			Saphir MsgClass ²
	ToOff	ToNormal	ToFault	ToOff	ToNormal	ToFault	
[1]	[1]	[1]	[5]	[x]	[x]	[]	0.
[2]	[2]	[2]	[5]	[x]	[x]	[]	1.
[3]	[3]	[3]	[6]	[x]	[x]	[]	2.
[4]	[4]	[4]	[6]	[x]	[x]	[]	3.
[5]	[1]	[2]	[5]	[x]	[x]	[]	4.
[12]	[1]	[1]	[5]	[x]	[x]	[]	5.



The default mapping table is prepared for Desigo Insight.

The flags ToOffNormal, ToFault and ToNormal are stored in BACnet Property AcknowledgeTransitions of each BACnet object.

Behavior, ToOffNormal, ToFault, ToNormal checked:

The alarm must be acknowledge in BACnet and after the alarm is fixed and reset from the HMI or Bacnetobject the alarm must also be reset in BACnet.

Behavior, ToOffNormal, ToFault checked:

The alarm must be acknowledge in BACnet and after the alarm is fixed and reset from the HMI or Bacnetobject the alarm in BACnet disappears.

Behavior, All unchecked:

No acknowledge in BACnet is required and after the alarm is fixed and reset from the HMI or Bacnetobject the alarm in BACnet disappears

-Press the "Update All" button after any changes.

8. Go back to the BACnet Config page and press the "Start BACnet Server" button. Now Bacnet is running.



Any changes on the BACnet Configuration Page needs a restart of the BACnet server by Shutdown and Start the BACnet server again.

3.2 Configure the RCC card for BBMD

Read first section 2.4 about BBMD. If needed and if RCC version VVS14.0 is used then an external device with BBMD support must be used on the same subnet. No other configuration is then needed on the RCC card.

4 Integration

4.1 General

The Saphir can be integrated to any BACnet client that supports BACnet/IP, for example, DESIGO INSIGHT and Clients with Cimentrics BACstac. Special care must be taken to the BACnet standard and what objects that are supported both on the Saphir and the client.

4.2 Using EDE files

The EDE Files are required if the BACnet Client doesn't support online engineering. It includes the mapping information's of all BACnet objects.

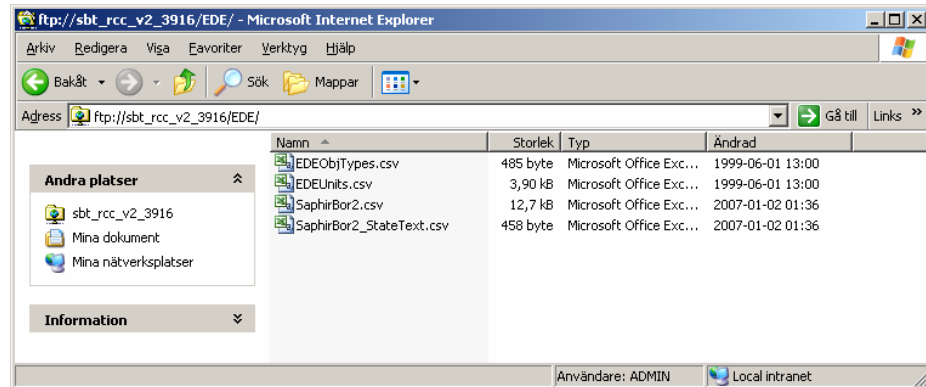
The BACnet Server creates following EDE files:

Devicename.csv	(application specific)
Devicename_StateText.csv	(application specific)
EDEObjTypes.csv	(default)
EDEUnits.csv	(default)

Those files can be found on the RCC card and are created at every restart of the BACnet server after approx 2 minutes.

Instruction

1. Connect to the FTP server with the WINS or the IP address via Internet Explorer and login with:
Username: ADMIN
Password: SBTAdmin!
Example: "ftp://ADMIN@SBT_RCC_V2_0AC1"
2. Open folder "EDE" and copy all files.



3. Use the EDE files with an integration tool or they could also be opened in Excel for view all the BACnet objects. In most cases there is only needed to use the application specific EDE files.

The EDEObjTypes.csv file defines all BACnet Object types.

The EDEUnits.csv file defines all BACnet Dimension.

In "Devicename".csv, row object-type and unit-code are referring to those two files. Row state-text-reference are referring to the "Devicename"_StateText.csv file.

Example of Devicename.csv

#	keyname	device	object-name	object-type	object-inst	description	supports	COV	unit-code	hi-limit	low-limit	state-text	min-preser	max-preser	unit-text
7	SaphirBor2-AC01	89	SaphirBor2	8	89	SaphirBor2-AC01	Y								
8	AC01-NC-Obj00	89	NC-Obj00	15	11	MsgClasses: 0,	Y								
9	AC01-NC-Obj01	89	NC-Obj01	15	21	MsgClasses: 1,	Y								
10	AC01-NC-Obj02	89	NC-Obj02	15	31	MsgClasses: 2,	Y								
11	AC01-NC-Obj03	89	NC-Obj03	15	41	MsgClasses: 3,	Y								
12	AC01-NC-Obj05	89	NC-Obj05	15	12	MsgClasses: 5,	Y								
13	AC01-NC-Obj06	89	NC-Obj06	15	22	MsgClasses: 6,	Y								
14	AC01-NC-Obj07	89	NC-Obj07	15	32	MsgClasses: 7,	Y								
15	AC01-NC-Obj08	89	NC-Obj08	15	42	MsgClasses: 8,	Y								
16	AC01-NC-Obj09	89	NC-Obj09	15	13	MsgClasses: 9,	Y								
17	AC01-NC-Obj10	89	NC-Obj10	15	23	MsgClasses: 10,	Y								
18	AC01-NC-Obj11	89	NC-Obj11	15	33	MsgClasses: 11,	Y								
19	AC01-NC-Obj12	89	NC-Obj12	15	43	MsgClasses: 12,	Y								
20	AC01-NC-Obj13	89	NC-Obj13	15	14	MsgClasses: 13,	Y								
21	AC01-NC-Obj14	89	NC-Obj14	15	24	MsgClasses: 14,	Y								
22	AC01-NC-Obj15	89	NC-Obj15	15	34	MsgClasses: 15,	Y								
23	AC01-ALD0	89	ALD0	19	54664	Reset	Y							1	
24	AC01-AHU1	89	AHU1	14	50538	Saphir	Y							2	
25	AC01-AHU1-CAL2	89	AHU1-CAL2	6	117472	Kalender stopp	Y								
26	AC01-AHU1-CAL1	89	AHU1-CAL1	6	103680	Kalender undantag	Y								
27	AC01-AHU1-TSUX	89	AHU1-TSUX	17	128673	Aggregat	Y							2	
28	AC01-AHU1-GT20	89	AHU1-GT20	0	126698	RumFdnluftstemp	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
29	AC01-AHU1-AL54	89	AHU1-AL54	3	104192	Larm Brand FF-Givare	Y								3
30	AC01-AHU1-AL21	89	AHU1-AL21	3	93962	Larm RumFF-Givare	Y								3
31	AC01-AHU1-GT10	89	AHU1-GT10	0	89026	Tilluftstemp	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
32	AC01-AHU1-AL53	89	AHU1-AL53	3	115187	Larm Brand TF-Givare	Y								3
33	AC01-AHU1-AL23	89	AHU1-AL23	3	96570	Larm TF-Givare	Y								3
34	AC01-AHU1-GT90	89	AHU1-GT90	0	92346	Utetemp	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
35	AC01-AHU1-AL22	89	AHU1-AL22	3	67007	Larm UteGivare	Y								3
36	AC01-AHU1-GT80	89	AHU1-GT80	0	121388	Frysavststemp	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
37	AC01-AHU1-AL24	89	AHU1-AL24	3	75629	Larm FrysGivare	Y								3
38	AC01-AHU1-GT50	89	AHU1-GT50	0	120391	MuFuncTmp1	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
39	AC01-AHU1-AL25	89	AHU1-AL25	3	107379	Larm Multi1 Givare	Y								3
40	AC01-AHU1-GT51	89	AHU1-GT51	0	124462	MuFuncTmp2	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
41	AC01-AHU1-AL26	89	AHU1-AL26	3	80047	Larm Multi2 Givare	Y								3
42	AC01-AHU1-BO10	89	AHU1-BO10	0	81265	EttBövr	Y	62	150.00000	-256.000000				-256.00000	300.000000 °C
43	AC01-AHU1-GO10	89	AHU1-GO10	0	69273	Lufthvälté	Y	95	3000.00000	-10000.000000				-10000.000000	0000.00000 Pa
44	AC01-AHU1-GP11	89	AHU1-GP11	0	88684	Tryck TF	Y	95	3000.00000	-10000.000000				-10000.000000	0000.00000 Pa
45	AC01-AHU1-GP10	89	AHU1-GP10	0	111594	TryckFlöde TF	Y	95	1500.00000	-10000.000000				-10000.000000	0000.00000 Pa
46	AC01-AHU1-GP20	89	AHU1-GP20	0	96885	TryckFlöde FF	Y	95	1500.00000	-10000.000000				-10000.000000	0000.00000 Pa
47	AC01-AHU1-GE59	89	AHU1-GE59	2	125810	Låg verkningrad	Y	98	100.000000	0.000000				0.000000	100.000000 %
48	AC01-AHU1-AD14	89	AHU1-AD14	2	101538	DtHRCERAlarm	Y	72	600.000000	0.000000				0.000000	600.000000 min
49	AC01-AHU1-AL14	89	AHU1-AL14	3	108661	Låg Verkningsgrad	Y								3
50	AC01-AHU1-GE61	89	AHU1-GE61	0	110029	Verkningsgrad	Y	98	164.00000	-100.000000				-100.00000	328.000000 %
51	AC01-AHU1-AL01	89	AHU1-AL01	3	128718	Larm Rök/Brand	Y								3
52	AC01-AHU1-D01	89	AHU1-D01	19	100336	Rök/Brand	Y								1
53	AC01-AHU1-AL02	89	AHU1-AL02	3	96955	Larm VVX	Y								3



Both the object-name and the object-instance can be used as a BACnet reference.

5 BACnet Object types and members

This chapter explains the members in the Saphir that can be used for each BACnet object type. BACnet objects can contain more properties than describe in this document and some are also not used. Recommended members to use with BACnet are marked, other members should be used with carefulness, especially the "ValueDetection" member.

5.1.1 General

BACnet object: All

BACnet property	Member Name	Description
Object Identifier		
Object Name	ObjectName	Name/Description of the actual object
Object Type		Type of BACnet object e.g. Analog Value
Units	DimensionText	Unit for the object e.g. °C
State Text	StateText	State text for the object e.g. Off/On
Status Flags		

5.1.2 Setpoint: Real

BACnet object: Analog Value

BACnet property	Member Name	Description
Out Of Service	UserAccess	Specifies operation privilege. Member setpoint can only be changed in "Man" (0)/Out of Service=TRUE.
High Limit	HighLimit	High input limit for member setpoint (Read only)
Low Limit	LowLimit	Low input limit for member setpoint (Read only)
Present Value	Setpoint	Valid setpoint

5.1.3 Setpoint: Enum

BACnet object: Multistate Value

BACnet property	Member Name	Description
Out Of Service	UserAccess	Specifies operation privilege. Member setpoint can only be changed in "Man" (0)/Out of Service=TRUE.
High Limit	HighLimit	High input limit for member setpoint (Read only)
Present Value	Setpoint	Valid setpoint

5.1.4 Messure (Analog input)

BACnet object: Analog Input

BACnet property	Member Name	Description
Event State	HighLimit1Active	Indicates that the value is above the high alarm limit.
Event State	LowLimit1Active	Indicates that the value is below the low alarm limit.
Notification Class	MessageClass	Fault message class
Present Value	PresentValue	This parameter signalizes the measured value without an error.
High Limit	HighLimit1	High alarm limit
Low Limit	LowLimit1	Low alarm limit

5.1.5 PosCommand (Analog output)

BACnet object: Analog Output

BACnet property	Member Name	Description
Out Of Service	ValueDetection	This parameter can be used to deactivate the detection of present position.
Status Flags	Fault	Indicates the stored fault.
Notification Class	MessageClass	Fault message class
High Limit	HighLimit	The high control limit of the control element can be entered here.
Low Limit	LowLimit	Low control limit of the control element
Present Value	Setpoint	Indicates the present position setpoint.

5.1.6 Message (Alarms)

BACnet object: Binary Input

BACnet property	Member Name	Description
Out Of Service	ValueDetection	This parameter can be used to deactivate the detection of parameter CurrentState.
Present Value	CurrentState	Indicates the current state of the alarm.
	StoredState	Indicates the stored state.
Polarity	WorkingContact	"Active" means normally open contact.
Notification Class	MessageClass	Fault message class

5.1.7 SwitchCommand (Digital outputs)

BACnet object: Multistate Output

BACnet property	Member Name	Description
Out Of Service	ValueDetection	This parameter can be used to deactivate the detection of PresentStage.
Event State	Fault	Indicates a fault. Is generated if the PresentStage fails.
Notification Class	MessageClass	Fault message class
	PresentStage	Switching command feedback signal
Present Value	SetpointStage	Indicates the present step setpoint.
Number Of States	MaxStage	Maximum permissible switching step. 1 signifies, for example 0=off and 1=Step 1 is permitted.

5.1.8 Counter

BACnet object: Analog Value

BACnet property	Member Name	Description
Out Of Service	ValueDetection	This parameter can be used to deactivate the detection of parameter ValueFault.
Status Flags	ValueFault	Active indicates that this counter value is in an error state.
Notification Class	MessageClass	Fault message class
Present Value	CounterValue	Internal pulse counter value
High Limit	HighLimit	Resultant value high limit

5.1.9 Time Shedule

BACnet object: Shedule

BACnet property	Member Name	Description

5.1.10 Calendar

BACnet object: Calendar

BACnet property	Member Name	Description

6 BACnet tag translation

6.1 Air Handling Units

BACnet tags for for IV Product LB20 v4.x application.

6.1.1 Setpoints, Temperature

BACnet name	Description	Object type
GBE1	Basic setpoint temperature, Economy	Setpoint: Real
GBK1	Basic setpoint temperature, Comfort	"
DE10	Deadzone cooling, Economy	
DK10	Deadzone cooling, Comfort	
TSN1	Min setpoint supply air temperature, cascade control	
TSX1	Max setpoint supply air temperature, cascade control	
BO10	Presentation remote setpoint	Messure
TS41	Setpoint HRC frost protection	Setpoint: Real
TS51	Setpoint post-conditioning	"
TS80	Setpoint frostprotection, operating temperature	
TS81	Setpoint frostprotection, keeping warm	

6.1.2 Setpoints, Pressure / Flow

BACnet name	Description	Object type
VS10	Setpoint flow supply air lowspeed	Setpoint: Real
VS11	Setpoint flow supply air highspeed	"
VS20	Setpoint flow exhaust air lowspeed	
VS21	Setpoint flow exhaust air highspeed	
VX1	Max setpoint pressure/flow supply air	
VX2	Max setpoint pressure/flow exhaust air	
DKV1	Deadzone fan compensation heating	

6.1.3 Setpoints, Others

BACnet name	Description	Object type
-------------	-------------	-------------

6.1.4 General settings / values

BACnet name	Description	Object type
GE01	Setpoint frost protection alarm	Setpoint:Real/Enum
GE09	Activate Smoke damper function control	"
GE12	Time since last smoke damper function control	
GE13	Test Smoke damper function control	SwitchCommand
GE15	Actual Fan runtime hours count	Messure
GE22	Room setpoint, night purge	Setpoint:Real/Enum
GE28	Delay time, timer mode	"
GE30	Limit unoccupied cooling	
GE31	Limit unoccupied heating	
GE36	Start setpoint summer compensation, temperature	
GE37	Stop setpoint summer compensation, temperature	
GE38	Delta setpoint summer compensation, temperature	
GE39	Start setpoint winter compensation, temperature	
GE40	Stop setpoint winter compensation, temperature	

BACnet name	Description	Object type
GE41	Delta setpoint winter compensation, temperature	
GE42	Max deviation temperature alarm	
GE43	Max delta heating, displacement ventilation	
GE44	Max delta cooling, displacement ventilation	
GE46	Setpoint HRC frost protection alarm	
GE57	Time fan overrun	
GE58	Min output signal return damper	
GE59	HRC efficiency alarm limit	
GE61	Actual HRC efficiency	Messure
GE72	Setpoint flow alarm	Setpoint:Real/Enum
GE73	Setpoint pressure alarm	"
GE77	Setpoint supply fan lowspeed, not controlled	
GE78	Setpoint supply fan highspeed, not controlled	
GE79	Setpoint exhaust fan lowspeed, not controlled	
GE80	Setpoint exhaust fan highspeed, not controlled	
GE91	Period of time between service for chiller machine	
GE98	Delta setpoint summer compensation, supply fan	
GE99	Delta setpoint winter compensation, supply fan	
G100	Delta setpoint summer compensation, exhaust fan	
G101	Delta setpoint winter compensation, exhaust fan	
G102	Start setpoint summer compensation, fan control	
G103	Stop setpoint summer compensation, fan control	
G104	Start setpoint winter compensation, fan control	
G105	Stop setpoint winter compensation, fan control	
G106	Start setpoint CO2, fan compensation	
G107	Stop setpoint CO2, fan compensation	
G120	Setpoint HRC defrost	
G122	Compensation flow setpoint exhaust fan	
G132	Setpoint CO2 return damper	
G133	Temperature compensation, supply/cascade control	

6.1.5 Temperature

BACnet name	Description	Object type
GT10	Supply air temperature	Messure
GT20	Exhaust/Room air temperature	"
GT50	Universal temperature 1	
GT51	Universal temperature 2	
GT80	Frost temperature	
GT90	Outdoor temperature	

6.1.6 Pressure / Flow

BACnet name	Description	Object type
GP10	Supply air pressure / flow	Messure
GP11	Supply/Exhaust air pressure, extra	"
GP20	Exhaust air pressure / flow	

6.1.7 Analog Inputs, Others

BACnet name	Description	Object type
GQ10	Air quality sensor	Messure

6.1.8 Analog Outputs

BACnet name	Description	Object type
SV10	Heating	PosCommand
SV20	Cooling	"
SV40	Post-conditioning	
HD10	Heating recovery (HRC)	
FO10	Frequency converter Supply fan	
FO20	Frequency converter Exhaust fan	
VK10	Heating compressor	

6.1.9 Digital Outputs

BACnet name	Description	Object type
ST10	Out door damper	SwitchCommand
ST50	Smoke damper	"
TF10	Supply fan 1 = Off, 2 = Lowspeed, 3 = Highspeed	
FF10	Exhaust fan 1 = Off, 2 = Lowspeed, 3 = Highspeed	
CP10	Heating pump / Electrical heater	
CP20	Cooling pump / DX step x	
DX10	Cooling DX step 1	
AL15	Alarm class B output	
AL16	Alarm class A output	

6.1.10 Digital Inputs

BACnet name	Description	Object type
DI01	Status fire/smoke alarm input	Setpoint: Enum
DI02	Status HRC alarm input	"
DI03	Status heating alarm input	
DI04	Status cooling alarm input	
DI05	Status AUX alarm input	
DI06	Status filter alarm input	
DI07	Status HRC pressureguard alarm input	
DI08	Status smoke damper input	
DI09	Status supply fan alarm input	
DI10	Status exhaust fan alarm input	

6.1.11 Alarms

BACnet name	Description	Object type
AL00	Reset Alarms	Setpoint: Enum
AL01	Fire / Smoke alarm	Message
AL02	HRC alarm	"
AL03	Heating pump alarm	
AL04	Cooling alarm	
AL05	AUX alarm	
AL06	Pressure / Flow control alarm supply air	
AL07	Pressure / Flow control alarm exhaust air	
AL09	Temperature deviation alarm	
AL10	Frost protection alarm	
AL11	Unit override alarm	
AL12	Smoke damper alarm	
AL13	HRC frost alarm	
AL14	HRC efficiency alarm	
AL15	Alarm class B output	SwitchCommand
AL16	Alarm class A output	"
AL19	Runtime alarm	Message

BACnet name	Description	Object type
AL20	Filter alarm	
AL21	Room / Exhaust sensor alarm	
AL22	Out door sensor alarm	"
AL23	Supply air sensor alarm	
AL24	Frost sensor alarm	
AL25	Multifunction sensor 1 (Z-sensor 1) alarm	
AL26	Multifunction sensor 2 (Z-sensor 2) alarm	
AL53	Supply temperature sensor fire alarm	
AL54	Exhaust temperature sensor fire alarm	

6.1.12 Alarm delay time

BACnet name	Description	Object type
AD09	Temperature deviation alarm delay time	Setpoint: Real
AD11	Unit override alarm delay time	"
AD14	HRC efficiency alarm delay time	
AD20	Filter alarm delay time	

6.1.13 Operating hours count

BACnet name	Description	Object type
-------------	-------------	-------------

6.1.14 Actual Operation mode / Setpoints

BACnet name	Description	Object type
OP01	HMI service switch 1 = Auto, 2 = Off, 3 = Lowspeed, 4 = Highspeed	Setpoint: Enum
OP02	Actual fan mode 1 = Off, 2 = Lowspeed, 3 = Highspeed	"
OP03	External switch / Timer mode 1 = Auto, 2 = Off, 3 = Lowspeed, 4 = Highspeed	
OP06	Actual setpoint for temperature control	Messure
OP07	Actual operation mode 1 = Damperkick, 2 = Testtemp, 3 = Off 4 = Economy, 5 = Comfort, 6 = Startup 7 = Nightpurge, 8 = Unoccupied, 9 = Overrun	Setpoint: Enum
OP08	Actual setpoint supply air pressure/flow	Messure
OP09	Actual setpoint exhaust air pressure/flow	"
OP12	Actual Emergency stop status (control via TB03)	Setpoint: Enum
OP14	Actual heating setpoint for temperature control	Messure
OP15	Actual cooling setpoint for temperature control	"

6.1.15 Operation mode control

BACnet name	Description	Object type
TB01	BMS override timeprogram 1 = Internal TSP, 2= Off, 3 = Eco St1 4 = Eco St2, 5 = Comf St1, 6 = Comf St2	Setpoint: Enum
TB02	Saphir local override timeprogram 1 = Internal TSP, 2= Off, 3 = Eco St1 4 = Eco St2, 5 = Comf St1, 6 = Comf St2	"
TB03	Emergency stop via communication 1 = Off / Normal, 2 = Stop	

6.1.16 Time shedule

BACnet name	Description	Object type
TSUX	Air handling unit, weekly schedule 1 = Off, 2 = Eco St1, 3 = Eco St2 4 = Comf St1, 5 = Comf St2	Shedule
TSUC	Air handling unit, calendar	
TSSX	SMS alarm routing, weekly schedule 1 = Off, 2 = Tel1, 3 = Tel2, 4 = Tel3, 5 = Tel4	Shedule
TSSC	SMS alarm routing, calendar	
TSEX	External device, weekly schedule 1 = Off, 2 = On	Shedule
TSEC	External device, calendar	
CAU1	Calendar unit exception	Calendar
CAU2	Calendar unit stop	"
CAS1	Calendar SMS exception	
CAE2	Calendar External device exception	

6.1.17 General

BACnet name	Description	Object type
AC01	Air conditioning	Device
AHU1	Air handling unit 1 = Off, 2 = Eco St1, 3 = Eco St2 4 = Comf St1, 5 = Comf St2	Unit
EXT1	External unit	"
SMS1	SMS time schedule	

Index

A

Abbreviations.....	5
About this document.....	5
Alarm handling	12

B

BACnet Broadcast Management Device (BBMD)	9
BACnet internetwork	8
BACnet MAC address	8
BACnet objects.....	12
BACnet properties	20
BACnet server functionality	12
BACnet Tags.....	23
Alarms.....	25
Analog inputs	24
Analog outputs	25
Digital inputs	25
Digital outputs	25
General	27
Operation counts.....	26
Operation modes	26
Setpoints	23
Settings	23
Time program.....	27
BACnet/IP	
Network.....	8
BBMD	9

C

Calendar.....	13
Configure	
BACnet.....	14
BBMD.....	17
IP.....	7
Connect.....	7

D

DHCP	7
------------	---

E

EDE files.....	18
----------------	----

F

Foreign Device Table (FDT).....	10
Foreign devices	10
FTP server.....	8

G

General introduction	6
----------------------------	---

I

Integration.....	18
IP address	7
IP broadcast	9

L

Limitations	11
-------------------	----

M

MAC address.....	7
Members.....	20
Mounting communication card.....	6

N

Name resolution (WINS).....	7
-----------------------------	---

O

Object	
Alarm.....	21
Analog input	20
Analog output	21
Calendar.....	22
Counter	21
Digital output	21
General	20
Setpoints	20
Time sheduler	21
Object types.....	20

P

Password.....	8
---------------	---

R

RCC Version.....	14
------------------	----

S

Step by step instruction	14, 17
Symbols.....	5

T

Tag translation.....	23
Time schedule	13
Troubleshooting.....	11

U

Update RCC image	8
------------------------	---

V,W

Webserver	8
-----------------	---

Siemens Building Technologies
HVAC Products
Elektronvägen 4
SE-141 87 HUDDINGE
Tel. 08-578 410 00
Fax
<http://www.sibt.se/>

© 2005 Siemens AB, HVAC Products
Subject to alteration