SIEMENS

SAPHIR
Universal LON Interface V2 (ACX36.040)
IV Produkt LB10 Application v1.2x

Engineering Guide

CE2Y3226en/IVP
2006.04.18

Siemens Building Technologies
HVAC Products

Contents

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 and use of the LON module.

1.2 Notes on Use

Target audience

This document is intended for developers who perform commissioning of the LON module.

Further information

For operation and planning of the SAPHIR OEM primary controller, please refer to additional documents, such as:

- SAPHIR ACX36..., Device Datasheet (No: CE2Q3226en)
- SAPHIR ACX36…, Basic Documentation (No: CE2P3226en)

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
LON	**L**ocal **O**perating **N**etwork
nvi	Input network variable
nvo	Output network variable
SNVT	**S**tandard **N**etvork **V**ariable **T**ype

1.4 Revision History

Revision	Date	Author	Remark
1.0	2006-04-18	Michael Sjöberg	First release

2 General

2.1 Overview

Purpose of LON communication

We are using LON Communication mostly to integrate our SAPHIR controllers into a building management system. The goal of integration is to have all necessary data on the management PC available and possible to change dedicated set points and stages.

Further information on LON

More information you will find on www.echelon.com and www.lonmark.org

2.2 Software

A special LON tool (for ex. LN220, LON Maker) must be used to configure the network, bind the variables and to observe the snvt's. The tool can also be used to download new updated XIF files (LON image) if necessary. To communicate with the LON device the PC must have an LON interface (card) installed as well.

3 LON bus priciples

3.1 Specification

The SAPHIR controllers uses FTT-10**A** (Free Topology Technology) transceivers at a 78 kbit/s network. When deciding on the topology, relevant factors are the maximum cable length and the distance between the two furthest bus subscribers.

Caution

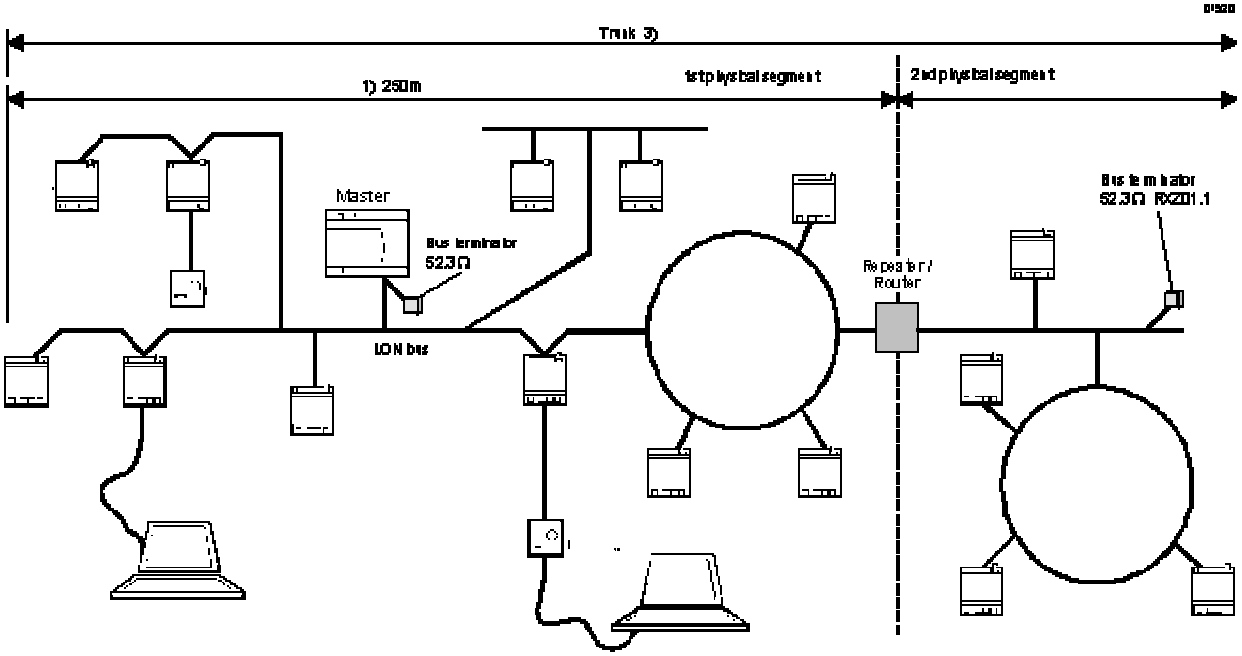
Physical segment	TP/FT-10
Admissible topologies	Free topology (including star and ring topologies) Line topology (bus topology)
Cable specification	Essential: Category 5 *unscreened* twisted-pair cable, with at least 18 twists per meter.
Technical data (Category 5)	
• Conductor cross-section	Min. ∅ 0.5mm, AWG24, 0.22mm²
• Impedance	100 Ω +/- 15 % @ f > 1 MHz
• Mutual capacitance between two conductors of a pair	< 46 nF/km
• Pair-to-earth capacitance unbalance	< 3.3 nF/km
• DC loop resistance	< 168 Ω
• Cable lengths	See "Topology"

3.2 Free topology

Description

The free topology (which may include star and ring topologies) is suitable for almost all types of building. However, the maximum cable length (total of all conductors) is limited to 450 m.

Where longer distances need to be covered, a line topology can be implemented, or a repeater or router can be used. No more than one physical repeater may be used in series, i.e. one physical repeater between any two devices.



Characteristics of each physical segment

Category 5 cable	
Max. cable length (total of all conductors including those to room units)	450 m
Max. distance between two devices (nodes) [1]	250 m
Max. number of devices (nodes) per physical segment	64 (FTT-10**A**) [2] 128 (LPT-10) [2]
The bus terminator, located at the key point of the physical segment, i.e. where the data traffic is at its highest (e.g. Master device)	52.3 Ω (RXZ01.1)

1) The maximum cable distance between the two nodes the furthest apart in a given physical segment must not exceed 250m.

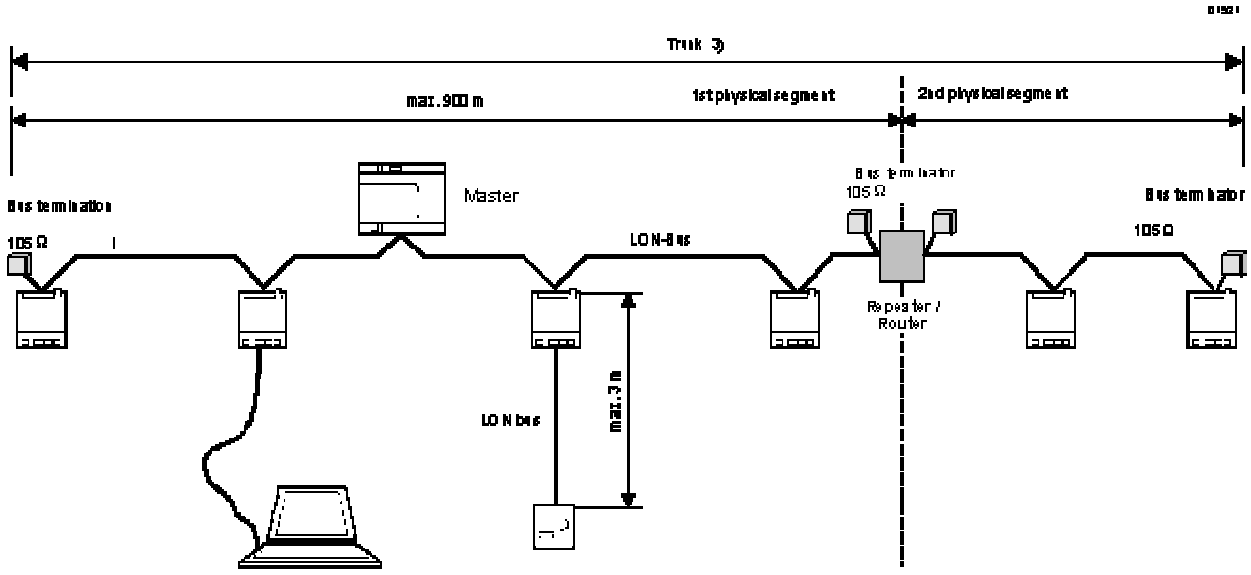
2) In mixed configurations of FTT-10**A** and LPT-10 devices, the following formula applies:
(1 x number of LPT-10 devices) + (2 x number of FTT-10**A** devices) ≤ 128

3) 1 "trunk" = Everything connected to Master device

3.3 Line topology

Description

A line topology is primarily used where a long bus cable is required (>450m) or where the maximum distance between two devices is >250m.
Note, however, that the length of the LON stubs must not exceed 3 m (including the cable to the room unit).



Characteristics of each physical segment

Category 5 cable	
Max. cable length	900 m
Max. stub length	3 m [1)]
Max. number of devices (nodes) per physical segment	64 (FTT-10**A**) [2)] 128 (LPT-10) [2)]
Bus terminators at each end of the physical segment	105 Ω (RXZ02.1) each end

Caution

1) **Each spur or stub may have a maximum length of 3 m.**
This also applies to the connection of room units.

2) In mixed configurations of FTT-10**A** and LPT-10 devices, the following formula applies:
(1 x number of LPT-10 devices) + (2 x number of FTT-10**A** devices) ≤ 128

3) 1 "trunk" = Everything connected to a Master device

3.4 Troubleshooting

Signal level too low

- Wrong bus terminator (e.g. RXZ01.1 instead of RXZ02.1)
- Too many bus terminators (e.g. the built-in bus terminator in a repeater or in a bus power supply may have been forgotten)

Signal level (too) high

- A high-level signal or “signal reflections” indicate that there is no bus terminator or the wrong bus terminator.
- Bus terminator in wrong place
  → Find the key point in the network by trial and error

4 LON accessories

4.1 Bus termination guidelines

- Linear topology
  → 2 bus terminators, 105 Ω each (RXZ02.1) at each end of the network.
- Free topology
  → 1 bus terminator, 52.3 Ω (RXZ01.1) at the key point in the network.

Note

System devices (repeaters and routers) often have a built-in bus terminator with a resistance selector switch.

4.2 Repeaters / Routers

Repeaters and routers are used where:

- The total cable length of a physical segment exceeds 450 m (in a free topology) or 900 m (in a line topology)
- The maximum number of devices (nodes) per physical segment is exceeded:
  – 64 in the case of FTT-10**A** transceivers

A maximum of one physical repeater may be used on each trunk.

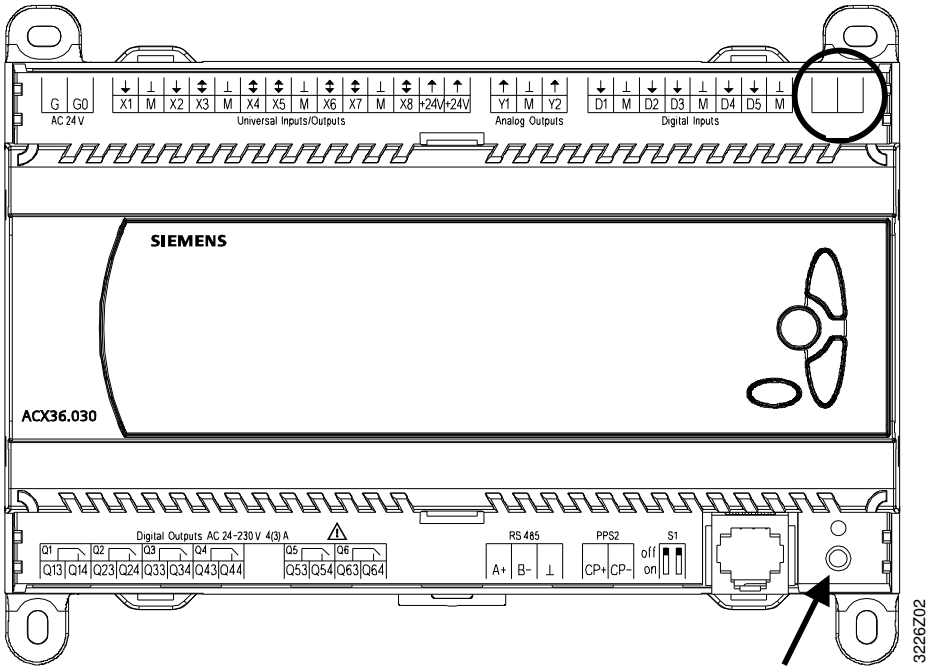
Caution

– Repeaters and routers must *never* be used in a ring topology. (They should be located before the ring port of the network).

5 LON communication

5.1 Configure and connect

Follow the instructions below to configure the LON device and connect to the LON bus.



1. Commissioning unit with all settings before starting to configure the LON device.
2. Log in with password 2000.
   Navigate to menu “Systemparameter – Communication – LON configuration”. If outdoor temperature shall be received via LON then the parameter “LON Outtemp” must be set to “Yes”. Configure other settings if needed.
3. Attach communication cable to connectors CLA and CLB at top right of the controller.
4. To set the address use the service pin S1.

6 Variable Overview

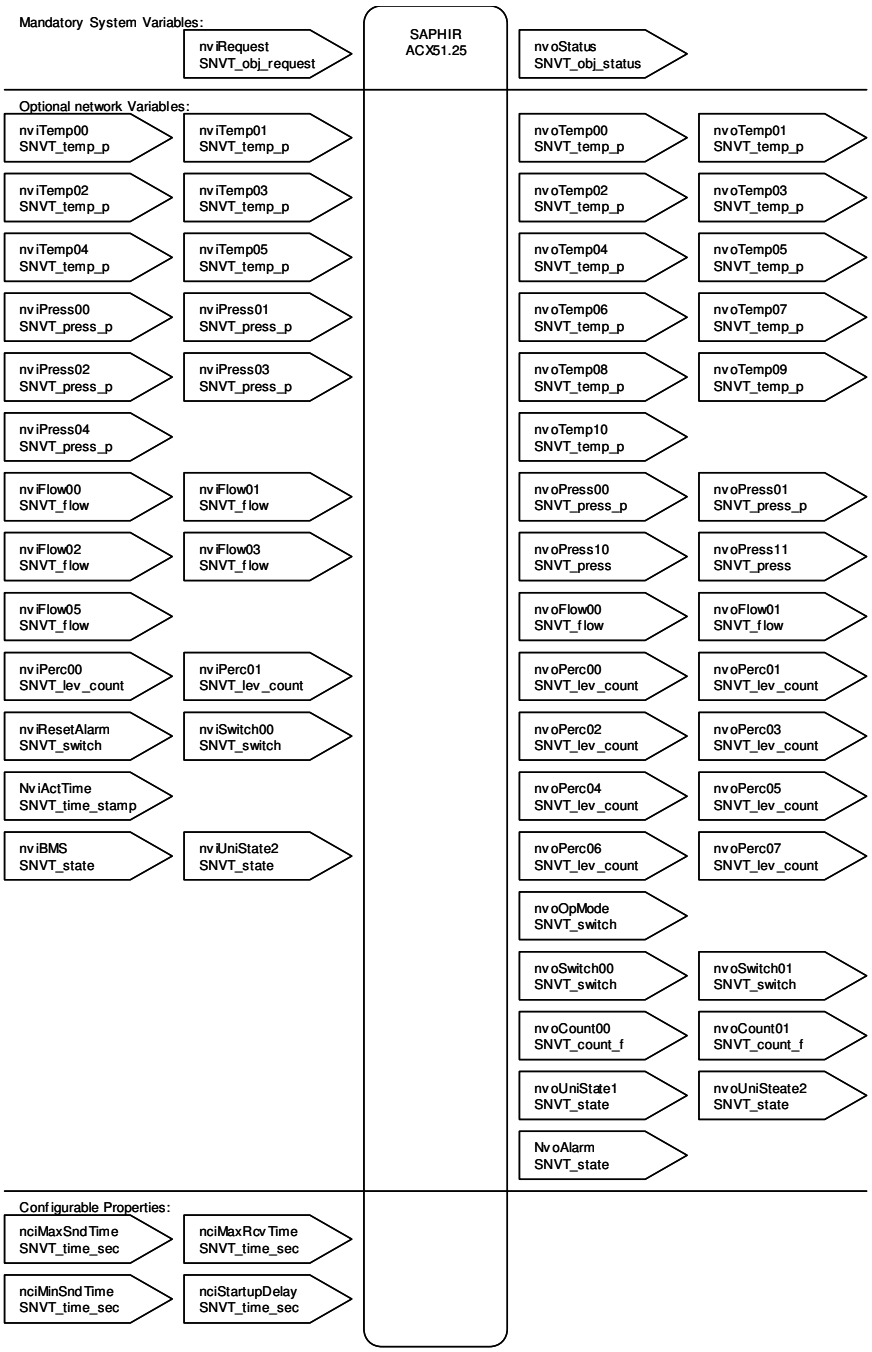
Introduction

This document refers to the SNVT definition with LON image (XIF) version >2.26, for integration of applications into a management station via a LON network. It includes all specifications for a successful integration.

Variables used in SAPHIR

The following graphic provides an overview of the variables used:

- **Mandatory System Variables**
- **Optional Network Variables**
- **Configurable Properties**



6.1 Type Definition of used Standard Mandatory System Variables Types:

6.1.1 SNVT_temp_p

Temperature

To be used for heating, ventilation and air conditioning (HVAC) applications.

SNVT Index	Measurement	Type Category	Type Size
105	Temperature	Fixed-Point Scalar signed long	2 Bytes
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
-273,13 ... 327,66	0.01	Degrees Celsius	32'767 (0x7FFF)
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 65'535 (0x0000 ... 0xFFFF)	1, -2, 0 $S = a*10^{b}*(R+c)$	N/A	N/A

6.1.2 SNVT_press_p

Pressure (gauge)

SNVT Index	Measurement	Type Category	Type Size
113	Pressure (gauge)	Fixed-Point Scalar signed long	2 Bytes
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
-32'768 ... 32'766	1	Pascals	32'767 (0x7FFF)
Raw Range	**Scale Factors**	**File Name**	**Default Value**
-32'768 ... 32'766 (0x8000 ... 0xFFFF, 0x0000 ... 0x7FFE)	1, 0, 0 $S = a*10^{b}*(R+c)$	N/A	N/A

6.1.3 SNVT_flow

Flow Volume

Used for heating, ventilation, and air conditioning applications. The typical flow in this area is 1 to 65000 l/s.

SNVT Index	Measurement	Type Category	Type Size
15	Flow Volume	Fixed-Point Scalar signed long	2 Bytes
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
0 ... 65'534	1	liters/second	65'535 (0xFFFF)
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0..65'534 (0x0000..0xFFFE)	1, 0, 0 $S = a*10^{b}*(R+c)$	N/A	N/A

6.1.4 SNVT_lev_count

Continuous Level

SNVT Index	Measurement	Type Category	Type Size
21	Continuous Level	Fixed-Point Scalar unsigned short	1 Byte
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
0 ... 100	0.5	% of full level	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 200 (0x00 ... 0xC8)	5, -1, 0 $S = a*10^{b}*(R+c)$	N/A	N/A

6.1.5 SNVT_switch

Switch

SNVT Index	Measurement	Type Category	Type Size
95	Switch	Structure	2 Bytes

typedef struct {
unsigned value;
signed state;
} SNVT_switch;

value: Intensity as percentage of full scale, resolution 0.5%.

Field	Measurement	Field Type Category	Field Size
Value	Value	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
0 ... 100	0.5	% of full scale	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 200 (0x00 ... 0xC8)	5, -1, 0 $S = a*10^{b}*(R+c)$	N/A	N/A

state: This field can either be -1 (NULL), 0 (OFF), or +1 (ON).

Field	Measurement	Field Type Category	Field Size
State	State	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
0 ... 1 (0x00 ... 0x01)	1	State Code	-1 (0xFF)

6.1.6 SNVT_state

State

Each state is a Boolean, single-bit value.

SNVT Index	Measurement	Type Category	Type Size
83	State Vector	Bitfield	2 Bytes

```
typedef struct {
                    unsigned    bit0 : 1;
                    unsigned    bit1 : 1;
                    .. .. .
                    unsigned    bit15 : 1;
} SNVT_state;
```

Field	Measurement	Field Type Category	Field Size
Bit 0 through Bit 15	State Bits 0 through 15	Bitfield	16 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 65’565	bit0, bit8 begin offset counts from zero (0)	16 individual Boolean Values	

Formats (state and state_64)

SNVT_state: text("%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d", bit0, bit1, bit2, bit3, bit4, bit5, bit6, bit7, bit8, bit9, bit10, bit11, bit12, bit13, bit14, bit15,…)

6.1.7 SNVT_state_64

State

Each state is a Boolean, single-bit value.

SNVT Index	Measurement	Type Category	Type Size
165	State Vector	Bitfield	8 Bytes

```
typedef struct {
                    unsigned    bit0 : 1;
                    unsigned    bit1 : 1;
                    .. .. .
                    unsigned    bit63 : 1;
} SNVT_state_64;
```

Bit 0 through Bit 63 : State Bits 0 through 63

Field	Measurement	Field Type Category	Field Size
Bit 0 through Bit 15	State bits 0 through 15	Bitfield	16 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 18446744073709551615 (0x0000000000000000 ... 0xFFFFFFFFFFFFFFFF)	bit0, bit8, bit16, bit24, bit32, bit40, bit48 & bit56 begin offset counts from zero (0)	64 individual Boolean Values	-1 (0xFF)

6.1.8 SNVT_time_stamp

Time Stamp

SNVT Index	Measurement	Type Category	Type Size
84	Time Stamp	Structure	7 Bytes

```
typedef struct {
        signed long     year;
        unsigned short  month;
        unsigned short  day;
        unsigned short  hour;
        unsigned short  minute;
        unsigned short  second;
} SNVT_time_stamp;
```

year: zero (0) means year not specified; minus one represents NULL date.

Field	Measurement	Field Type Category	Field Size
Year	Year	Fixed-Point Scalar signed long	16 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 3'000	1	Year	-1 (0xFFFF)
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 3'000 (0x0000 ... 0x0BB8)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

month: zero (0) means month not specified.

Field	Measurement	Field Type Category	Field Size
Month	Month	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 12	1	Month of Year	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 12 (0x00 ... 0x0C)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

day: zero (0) means day not specified.

Field	Measurement	Field Type Category	Field Size
Day	Day	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 31	1	Day of Month	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 31 (0x00 ... 0x1F)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

Time stamp, *continued*

hour: this field uses an 24-hour value.

Field	Measurement	Field Type Category	Field Size
Hour	Hour	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 23	1	Hour of Day	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 23 (0x00 ... 0x17)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

minute: minutes.

Field	Measurement	Field Type Category	Field Size
Minute	Minutes	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 59	1	Minute of Hour	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 59 (0x00 ... 0x3B)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

second: seconds.

Field	Measurement	Field Type Category	Field Size
Second	Second	Fixed-Point Scalar unsigned short	8 Bits
Valid Type Range	**Byte Offset**	**Units**	**Invalid Value**
0 ... 59	1	Second of Minute	
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 59 (0x00 ... 0x3B)	1, 0, 0 $S = a*10^b*(R+c)$	N/A	N/A

6.1.9 SNVT_time_sec

Time Sec

SNVT Index	Measurement	Type Category	Type Size
107	Elapsed time	Fixed-Point Scalar signed long	2 Bytes
Valid Type Range	**Type Resolution**	**Units**	**Invalid Value**
0 ... 65’534	0.1	Seconds	6553.5 (0xFFF)
Raw Range	**Scale Factors**	**File Name**	**Default Value**
0 ... 65’534 (0x0000 ... 0xFFFE)	1, 0, 0 $S = a*10_b*(R+c)$	N/A	N/A

7 Mandatory System Variables

7.1 Input Variables

Network Name: nviRequest
Description:
Object: SNVT_Obj_Request
Remarks:

7.2 Output Variables

Network Name: nviRequest
Description:
Object: SNVT_Obj_Status
Remarks:

8 Configurable Properties

Network Name: nciMaxSndTime
Description: Send Heartbeat

Max. time an output variable has to be send even if there hasn't changed anything.

Object: SNVT_Time_Sec
Remarks:

Network Name: nciMaxRcvTime
Description: Receive Heartbeat

Max. time an input variable has to be received.
If it wasn't received during this time the value of this input variable is invalid.

Object: SNVT_Time_Sec
Remarks:

Network Name: nciMinSndTime
Description:

Object: SNVT_Time_Sec
Remarks:

Network Name: nciStartupDelay
Description:

Object: SNVT_Time_Sec
Remarks:

9 Optional Network Variables

9.1 Input Variables

Network Name: nviTemp00
Description: Heating Setpoint Comfort Basic Setpoint
Object: SNVT_temp_p
Remarks:

Network Name: nviTemp01
Description: Heating Setpoint Eco
Object: SNVT_temp_p
Remarks:

Network Name: nviTemp02
Description: Cooling Setpoint Comfort Dz Cooling
Object: SNVT_temp_p
Remarks:

Network Name: nviTemp03
Description: Cooling Setpoint Eco
Object: SNVT_temp_p
Remarks:

Network Name: nviTemp04
Description: Universal Setpoint Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nviTemp05
Description: Outside Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nviPress00
Description: Pressure Setpoint Supply Air LowSpeed
Object: SNVT_press_p
Remarks:

Input variables, *continued*

Network Name: nviPress01
Description: Pressure Setpoint Supply Air HighSpeed
Object: SNVT_press_p
Remarks:

Network Name: nviPress02
Description: Pressure Setpoint Exhaust Air LowSpeed
Object: SNVT_press_p
Remarks:

Network Name: nviPress03
Description: Pressure Setpoint Exhaust Air HighSpeed
Object: SNVT_press_p
Remarks:

Network Name: NviPress04
Description: Universal Setpoint Pressure
Object: SNVT_press_p
Remarks:

Network Name: nviFlow00
Description: Flow Setpoint Supply Air LowSpeed
Object: SNVT_flow
Remarks:

Network Name: nviFlow01
Description: Flow Setpoint Supply Air HighSpeed
Object: SNVT_flow
Remarks:

Network Name: nviFlow02
Description: Flow Setpoint Exhaust Air LowSpeed
Object: SNVT_flow
Remarks:

Input variables, *continued*

Network Name: nviFlow03
Description: Flow Setpoint Exhaust Air HighSpeed
Object: SNVT_flow
Remarks:

Network Name: nviFlow04
Description: Universal Setpoint Flow
Object: SNVT_flow
Remarks:

Network Name: nviPerc00
Description: Universal Setpoint Percent 1
Object: SNVT_lev_count
Remarks:

Network Name: nviPerc01
Description: Universal Setpoint Percent 2
Object: SNVT_lev_count
Remarks:

Network Name: nviSwitch00
Description: Operation Mode
Object: SNVT_switch
Values:

0	OFF	
1	Step 1	
2	Step 2	
> 2	Not defined	

State:

0	: Inactive	: Mode Auto
1	: Active	: Mode OS

Default:

Value	: 0
State	: 0

Remarks:

Input variables, *continued*

Network Name:	nviResetAlarm		
Description:	Reset / Acknowledge Alarm		
Object:	SNVT_switch		
Values:	0	Normal	
	1	Reset	
	> 1	Not defined	
State:	0	: Inactive	
	1	: Active	
Default:	Value	: 0	
	State	: 0	
Remarks:			

Network Name:	nviBMS		
Description:	BMS Override time scheduler		
Object:	SNVT_state		Bits*
Value:	0	Auto, internal time scheduler	Bit0=0
	1	Stop mode	Bit0=1
	2	Step 1	Bit0=0, Bit1=1
	3	Step 2	Bit0=1, Bit1=1
	> 3	Not defined	
Remarks:	Counted numeric (Value 2 is not the bit2)		* On some Lon tools the bits are named in the other direction, so please take care. (Bit0=Bit15, Bit1=Bit14…)

Network Name:	NviActTime
Description:	Set Real Time Clock
Object:	SNVT_time_stamp
Remarks:	

Network Name:	nviUniState2
Description:	Universal State
Object:	SNVT_state
Remarks:	

9.2 Output Variables

Network Name: nvoTemp00
Description: Actual Setpoint Temperature Heating
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp01
Description: Actual Setpoint Temperature Cooling
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp02
Description: Actual Setpoint Supply Air Temperature Heating
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp03
Description: Actual Setpoint Supply Air Temperature Cooling
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp04
Description: External Setpoint
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp05
Description: Outside Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp06
Description: Supply Air Temperature
Object: SNVT_temp_p
Remarks:

Output variables, *continued*

Network Name: nvoTemp07
Description: Frost Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp08
Description: Room/Exhaust air Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nvoTemp09
Description: Multifunction 2 Temperature
Object: SNVT_temp_p
Remarks:

Network Name: NvoTemp10
Description: Multifunction 1 Temperature
Object: SNVT_temp_p
Remarks:

Network Name: nvoPress00
Description: Supply Air Pressure
Object: SNVT_press_p
Remarks:

Network Name: nvoPress01
Description: Exhaust Air Pressure
Object: SNVT_press_p
Remarks:

Network Name: nvoPress10
Description: Universal Pressure
Object: SNVT_press
Remarks:

Output variables, *continued*

Network Name: nvoPress11
Description: Universal Pressure
Object: SNVT_press
Remarks:

Network Name: nvoFlow00
Description: Supply Air Flow
Object: SNVT_flow
Remarks:

Network Name: nvoFlow01
Description: Exhaust Air Flow
Object: SNVT_flow
Remarks:

Network Name: nvoPerc00
Description: Heating Valve
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc01
Description: Cooling Valve
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc02
Description: Heat Recovery
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc03
Description: HRC Efficiency
Object: SNVT_lev_count
Remarks:

Output variables, *continued*

Network Name: nvoPerc04
Description: Supply Air Fan Speed
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc05
Description: Exhaust Air Fan Speed
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc06
Description: AirQuality
Object: SNVT_lev_count
Remarks:

Network Name: nvoPerc07
Description: Universal Percent
Object: SNVT_lev_count
Remarks:

Network Name: nvoOpMode
Description: Operation Mode
Object: SNVT_switch
Values:

0	OFF	
1	Step 1 (ON)	
2	Step 2	
3	Undefined	
4	Testtemp	
5	Nightpurge	
6	Unoccupied	
7	Startup	
8	Overrun	
9	Damperkick	
> 9	Not defined	

State:

0	: Inactive	: Mode Auto
1	: Active	: Mode OS

Default:

Value	: 0
State	: 0

Remarks:

Output variables, *continued*

Network Name: nvoSwitch00
Description: Fan Speed
Object: SNVT_switch
Values:

0	OFF
1	Step 1
2	Step 2
> 2	Not defined

Remarks:

Network Name: nvoSwitch01
Description: Universal Switch
Object: SNVT_switch
Remarks:

Network Name: nvoCount00
Description: Universal count 1
Object: SNVT_count_f
Remarks:

Network Name: nvoCount01
Description: Universal count 2
Object: SNVT_count_f
Remarks:

Output variables, *continued*

Network Name: nvoUniState1
Description: Bit Array 1
Object: SNVT_state *Reverse view on Tool
Bits: Bit [0 ... 15]

0	Heating pump	15	Heating pump
1	Cooling pump	14	Cooling pump
2	Outdoor damper	13	Outdoor damper
3	Sum alarm A	12	Sum alarm A
4	Sum alarm B	11	Sum alarm B
5	Smoke damper	10	Smoke damper
6	Chiller DX step 2	9	Chiller DX step 2
7	Supplyfan off	8	Supplyfan off
8	Supplyfan lowspeed	7	Supplyfan lowspeed
9	Supplyfan highspeed	6	Supplyfan highspeed
10	Exhaustfan off	5	Exhaustfan off
11	Exhaustfan lowspeed	4	Exhaustfan lowspeed
12	Exhaustfan highspeed	3	Exhaustfan highspeed
13	Not defined	2	Not defined
14	Not defined	1	Not defined
15	Not defined	0	Not defined

Remarks: * On some Lon tools the bits are named in the other direction, so please take care

Network Name: nvoUniState2
Description: Bit Array 2
Object: SNVT_state *Reverse view on Tool
Bits: Bit [0 ... 15]

0	Not defined	15	Not defined
1	Not defined	14	Not defined
2	Not defined	13	Not defined
3	Service switch stop	12	Service switch stop
4	Not used	11	Not used
5	Not used	10	Not used
6	Not used	9	Not used
7	Control input stop	8	Control input stop
8	Control input lowsp.	7	Control input lowsp.
9	Control input highsp.	6	Control input highsp.
10	Room controller	5	Room controller
11	Supply controller	4	Supply controller
12	Exhaust controller	3	Exhaust controller
13	Not defined	2	Not defined
14	Not defined	1	Not defined
15	Emergency stop	0	Emergency stop

Remarks: * On some Lon tools the bits are named in the other direction, so please take care

Output variables, *continued*

Network Name: NvoAlarm
Description: Alarm Array
Object: SNVT_state_64 *Reverse view on Tool
Value: Bit [0 ... 63]

0	General	63	General
1	Level A	62	Level A
2	Level B	61	Level B
3	Level C	60	Level C
4	Temperature dev	59	Temperature dev
5	Fire / smoke	58	Fire / smoke
6	Heat recovery	57	Heat recovery
7	Pump / heating	56	Pump / heating
8	Cooling	55	Cooling
9	AUX	54	AUX
10	Supply fan	53	Supply fan
11	Exhaust fan	52	Exhaust fan
12	Not defined	51	Not defined
13	Frost protection	50	Frost protection
14	HRC frost protection	49	HRC frost protection
15	HRC pressureguard	48	HRC pressureguard
16	Low HRC efficiency	47	Low HRC efficiency
17	Unit override	46	Unit override
18	Filter	45	Filter
19	Roomunit	44	Roomunit
20	Room/exhaust sensor	43	Room/exhaust sensor
21	Outdoor sensor	42	Outdoor sensor
22	Supply air sensor	41	Supply air sensor
23	Frost sensor	40	Frost sensor
24	Multifunc.sensor 1	39	Multifunc.sensor 1
25	Multifunc.sensor 2	38	Multifunc.sensor 2
26	Unit runtime	37	Unit runtime
27	Smoke damper	36	Smoke damper
28	Not used	35	Not used
29	Not defined	34	Not defined
...	.....	...	.....
62	Not defined	1	Not defined
63	Others	0	Others

Remarks: * On some Lon tools the bits are named in the other direction, so please take care

10 SNVT list

Used SNVT's in this application. Se Chaper 6-9 for more information about each SNVT.

LON SNVT	Description	Remark
nviTemp00	Heating Setpoint (Basic setpoint)	
nviTemp02	Cooling Setpoint (Dz Cooling)	
nviTemp05	Outside Temperature	
nviResetAlarm	Reset / Acknowledge Alarm	
nviBMS	BMS Override Timeprogram	
NviActTime	Set Real Time Clock	
nvoTemp00	Actual Setpoint Temperature Heating	
nvoTemp01	Actual Setpoint Temperature Cooling	
nvoTemp02	Actual Setpoint Supply Air Temperature Heating	
nvoTemp03	Actual Setpoint Supply Air Temperature Cooling	
nvoTemp04	External Setpoint	
nvoTemp05	Outside Temperature	
nvoTemp06	Supply Air Temperature	
nvoTemp07	Frost Temperature	
nvoTemp08	Room/ Exhaust Air Temperature	
nvoTemp09	Multifunction temperature 2	
nvoTemp10	Multifunction temperature 1	
nvoPerc00	Heating Valve	
nvoPerc01	Cooling Valve	
nvoPerc02	Heat Recovery	
nvoPerc03	HRC Efficiency	
nvoPerc04	Supply Air Fan Speed	
nvoPerc05	Exhaust Air Fan Speed	
nvoOpMode	Actual Operation Mode	
nvoSwitch00	Actual Fan Mode	
nvoUniState1	Status Outputs	
nvoUniState2	Status Inputs	
NvoAlarm	Alarms	

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