

**FLEXIT<sup>®</sup>**



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# FLEXIT CS 1000

## **E** User Guide LON Operation



ART.NR.:55575

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# 1 About this Document

## 1.1 Foreword

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### 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 (LON card). The communication card ACX51.25 is used by the ACX32 and ACX34 controller.

## 1.2 Notes on Use

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### Target audience

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

## 1.3 Symbols and Abbreviations

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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	Local Operating Network
nvi	Input network variable
nvo	Output network variable
SNVT	Standard Network Variable Type

## 2 General

### 2.1 Overview

#### Purpose of LON communication

Further information on LON

We are using LON Communication mostly to integrate our SAPHIR 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. More information you will find on [www.echelon.com](http://www.echelon.com) and [www.lonmark.org](http://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 principles

### 3.1 Specification

The SAPHIR controllers uses FTT-10A (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.



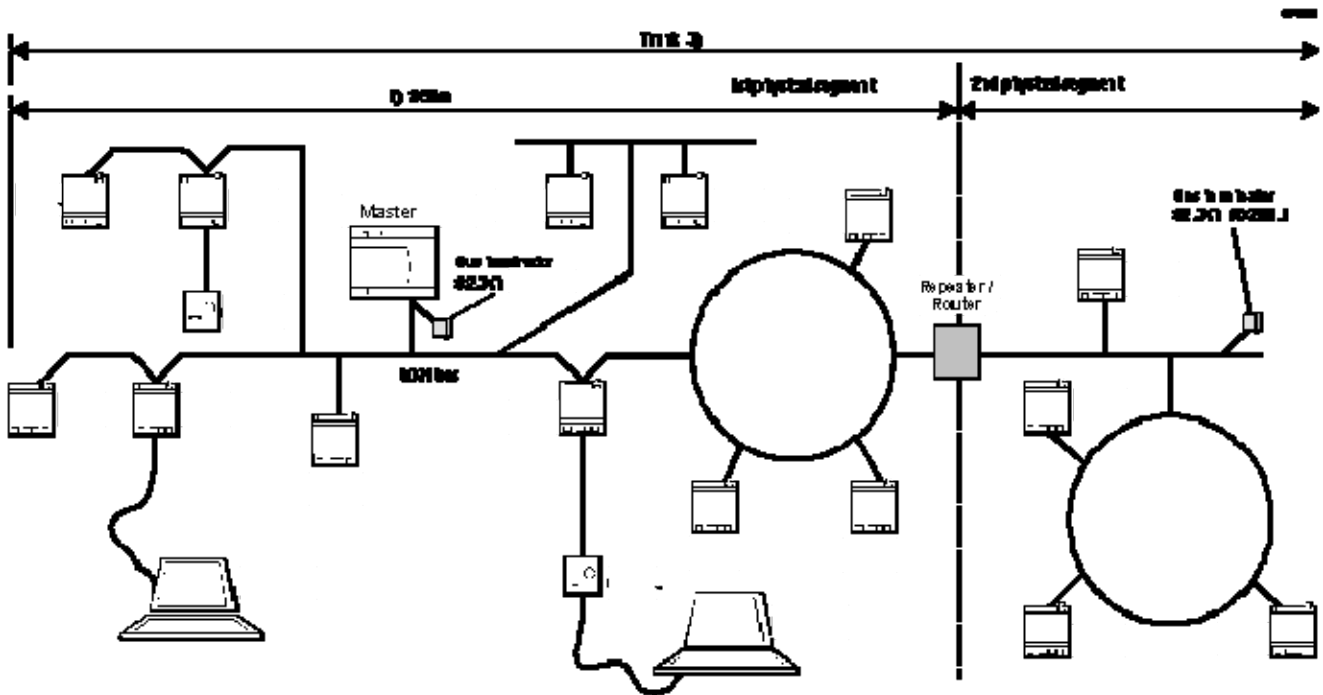
Physical segment	TP/FT-10
Admissible topologies	Free topology (including star and ring topologies) Line topology (bus topology)
Cable specification	Essential: Category 5 <i>unscreened</i> twisted-pair cable, with at least 18 twists per meter.
Technical data (Category 5)	
• Conductor cross-section	Min. $\varnothing$ 0.5mm, AWG24, 0.22mm <sup>2</sup>
• Impedance	100 $\Omega$ +/- 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 $\Omega$
• 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) <sup>1)</sup>	250 m
Max. number of devices (nodes) per physical segment	64 (FTT-10A) <sup>2)</sup> 128 (LPT-10) <sup>2)</sup>
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)

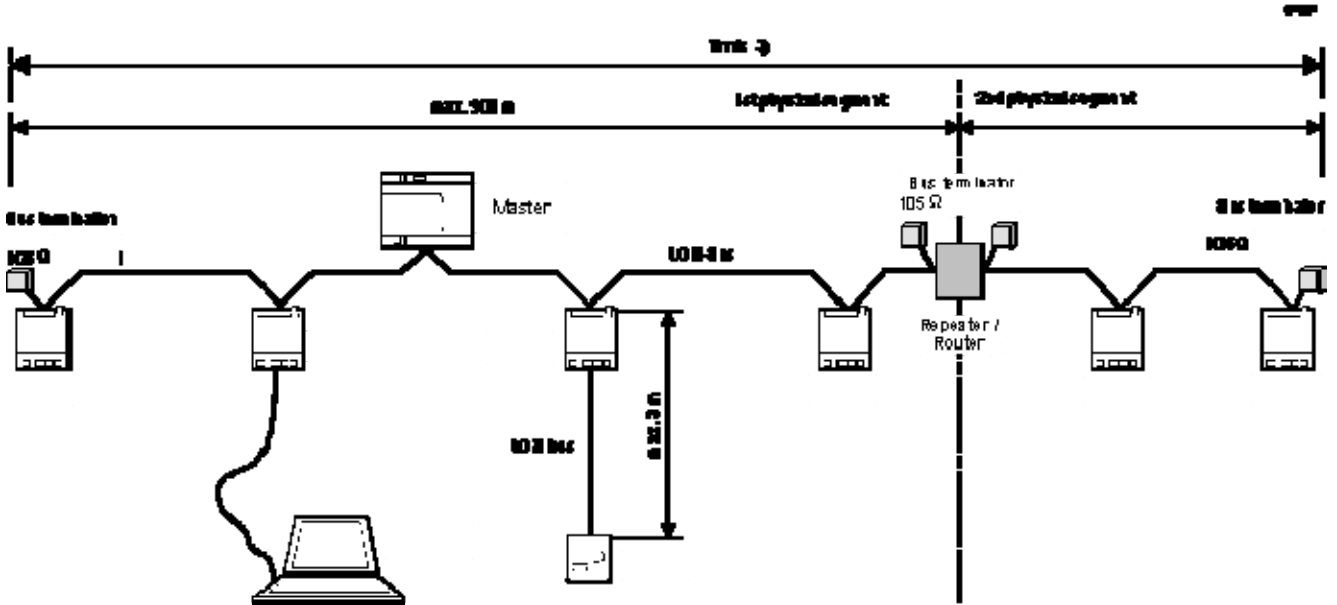
- 1) The maximum cable distance between the two nodes the furthest apart in a given physical segment must not exceed 250m.
- 2) In mixed configurations of FTT-10A and LPT-10 devices, the following formula applies:  
(1 x number of LPT-10 devices) + (2 x number of FTT-10A devices) ≤ 128
- 3) 1 "trunk" = 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 <sup>1)</sup>
Max. number of devices (nodes) per physical segment	64 (FTT-10A) <sup>2)</sup> 128 (LPT-10) <sup>2)</sup>
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-10A and LPT-10 devices, the following formula applies:  
(1 x number of LPT-10 devices) + (2 x number of FTT-10A 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

### nviBMS

- The nviBMS snvt is used binary to set the numeric value (stage). For example, to have the numeric value 3, set bit 0=1 (bit15=1) and bit1=1 (bit14=1), binary that will be 3. Bit3 (bit12) shall then NOT be used.

### SNVT\_state

- The saphir are using snvt\_state binary counted from left to right and due to that some LON devices counts from right it's in that case necessary to invert the bits, Bit0=Bit15, Bit1=Bit14....

### SNVT\_switch

- The state part must be set to 1 (Active) to use the value part.

## 4 LON accessories

### 4.1 Bus termination guidelines

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- 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-10A transceivers

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



#### Caution

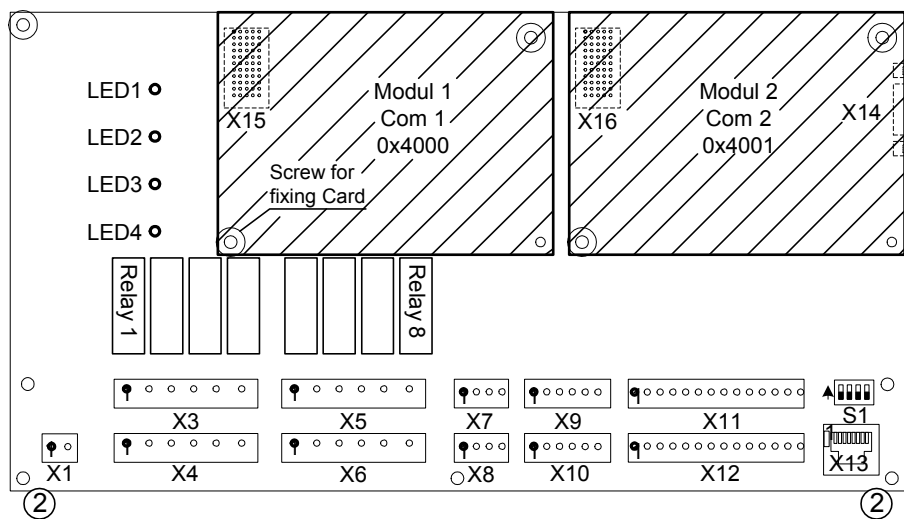
- Repeaters and routers must *never* be used in a ring topology. (They should be located before the ring port of the network).



# 5 LON communication card

## 5.1 Mounting

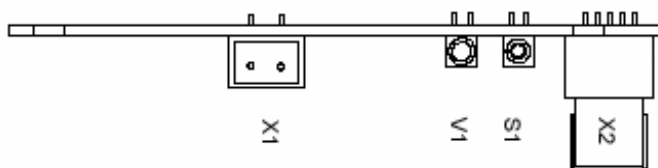
Follow the instructions below for mounting the LON card on the Saphir controller.



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. Place the card with belonging cover plate in the “Com 2” slot.  
**Note!** ACX51.25 has to be placed in this 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.

## 5.2 Configure

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



1. Commissioning unit with all settings before starting to configure your LON card.
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 connector X1.
4. To set the address use the service pin S1.

# 6 Variable Overview

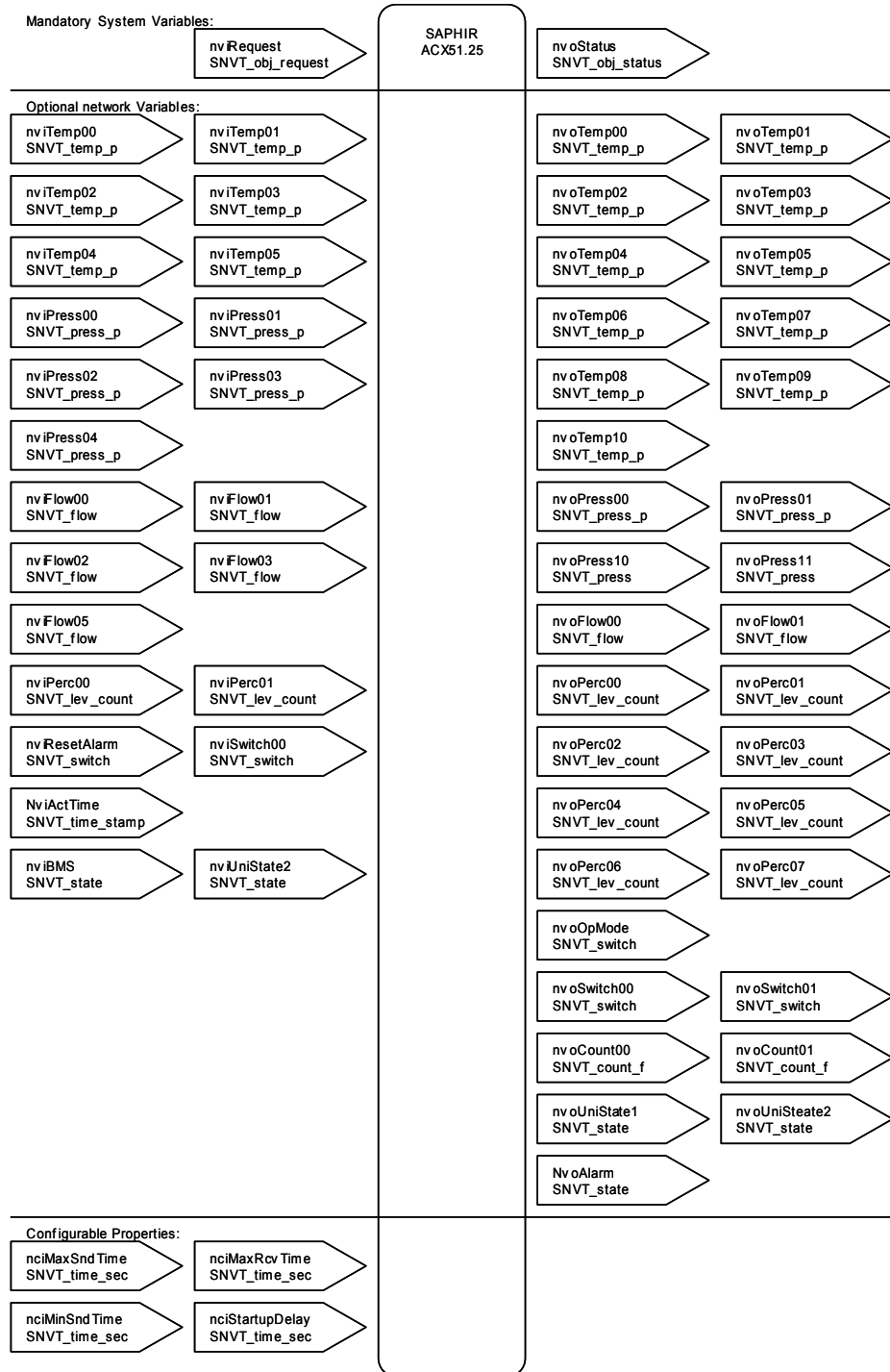
## Introduction

This document refers to the SNVT definition with LON image (XIF) version >2.24 (2.40), 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 $S = a \cdot 10^b \cdot (R+c)$	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 $S = a \cdot 10^b \cdot (R+c)$	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 $S = a \cdot 10^b \cdot (R+c)$	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 $S = a \cdot 10_b \cdot (R+c)$	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 $S = a \cdot 10_b \cdot (R+c)$	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 $S = a \cdot 10_b \cdot (R+c)$	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 $S = a \cdot 10_b \cdot (R+c)$	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 $S = a \cdot 10_b \cdot (R+c)$	N/A	N/A

## SNVT\_time\_stamp, continued

### 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
<b>Valid Type Range</b>	<b>Byte Offset</b>	<b>Units</b>	<b>Invalid Value</b>
0 ... 23	1	Hour of Day	
<b>Raw Range</b>	<b>Scale Factors</b>	<b>File Name</b>	<b>Default Value</b>
0 ... 23 (0x00 ... 0x17)	1, 0, 0 $S = a \cdot 10_b^*(R+c)$	N/A	N/A

**minute:** minutes.

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

**second:** seconds.

Field	Measurement	Field Type Category	Field Size
Second	Second	Fixed-Point Scalar unsigned short	8 Bits
<b>Valid Type Range</b>	<b>Byte Offset</b>	<b>Units</b>	<b>Invalid Value</b>
0 ... 59	1	Second of Minute	
<b>Raw Range</b>	<b>Scale Factors</b>	<b>File Name</b>	<b>Default Value</b>
0 ... 59 (0x00 ... 0x3B)	1, 0, 0 $S = a \cdot 10_b^*(R+c)$	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
<b>Valid Type Range</b>	<b>Type Resolution</b>	<b>Units</b>	<b>Invalid Value</b>
0 ... 65'534	0.1	Seconds	6553.5 (0xFFFF)
<b>Raw Range</b>	<b>Scale Factors</b>	<b>File Name</b>	<b>Default Value</b>
0 ... 65'534 (0x0000 ... 0xFFFFE)	1, 0, 0 $S = a \cdot 10_b^*(R+c)$	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 Comf  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nviTemp01  
Description: Heating Setpoint Eco      Basic Setpoint Eco  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nviTemp02  
Description: Cooling Setpoint Comfort      Dz Cooling Comf  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nviTemp03  
Description: Cooling Setpoint Eco      Dz Cooling Eco  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nviTemp04  
Description: Not used      Not used  
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: Not used  
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: Not used  
Object: SNVT\_flow  
Remarks:

Network Name: nviPerc00  
Description: Not used  
Object: SNVT\_lev\_count  
Remarks:

Network Name: nviPerc01  
Description: Not used  
Object: SNVT\_lev\_count  
Remarks:

Network Name: nviSwitch00  
Description: Not used  
Object: SNVT\_switch  
Values: 0 Off /Normal  
1 Stopp  
> 1 Not defined  
State: 0 : Inactive  
1 : Active  
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\*  
Bits: 0 Auto, internal time scheduler Bit0=0  
1 Stop mode Bit0=1  
2 Economy setpoint and step 1 Bit0=0, Bit1=1  
3 Economy setpoint and step 2 Bit0=1, Bit1=1  
4 Comfort setpoint and step 1 Bit0=0, Bit1=0, Bit2=1  
5 Comfort setpoint and step 2 Bit0=1, Bit1=0, Bit2=1  
> 5 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: Not used  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nvoTemp02  
Description: Not used  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nvoTemp03  
Description: Not used  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nvoTemp04  
Description: Not used  
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 Temperature  
Object: SNVT\_temp\_p  
Remarks:

Network Name: nvoTemp09  
Description: Exhaust air Temperature  
Object: SNVT\_temp\_p  
Remarks:

Network Name: NvoTemp10  
Description: HRC frost 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: Not used  
Object: SNVT\_press  
Remarks:

## Output variables, *continued*

Network Name: nvoPress11  
Description: Not used  
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: Not used  
Object: SNVT\_lev\_count  
Remarks:

Network Name: nvoPerc07  
Description: EI heat battery  
Object: SNVT\_lev\_count  
Remarks:

Network Name: nvoOpMode  
Description: Operation Mode  
Object: SNVT\_switch  
Values: 0 OFF  
1 Economy  
2 Comfort  
3 Nightpurge  
4 Unoccupied  
> 4 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 Low speed  
2 High speed  
> 2 Not defined  
Remarks:

Network Name: nvoSwitch01  
Description: Not used  
Object: SNVT\_switch  
Remarks:

Network Name: nvoCount00  
Description: Not used  
Object: SNVT\_count\_f  
Remarks:

Network Name: nvoCount01  
Description: Not used  
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 DX 1	14	Cooling DX 1
2	Outdoor damper	13	Outdoor damper
3	Sum alarm A	12	Sum alarm A
4	Sum alarm B	11	Sum alarm B
5	Cooling DX step 2	10	Cooling DX step 2
6	Electrical heater 2	9	Electrical heater 2
7	Electrical heater 3	8	Electrical heater 3
8	Not defined	7	Not defined
9	Not defined	6	Not defined
10	Not defined	5	Not defined
11	Not defined	4	Not defined
12	Not defined	3	Not defined
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	Extended OP	15	Extended OP
1	Forced OP	14	Forced OP
2	External Start	13	External Start
3	Service switch	12	Service switch
4	Not defined	11	Not defined
5	Not defined	10	Not defined
6	Not used	9	Not used
7	Not defined	8	Not defined
8	Not defined	7	Not defined
9	Not defined	6	Not defined
10	Not used	5	Not used
11	Not used	4	Not used
12	Not used	3	Not used
13	Not defined	2	Not defined
14	Not defined	1	Not defined
15	Not used	0	Not used

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	Not defined	60	Level C
4	Supply Temperature	59	Supply Temperature
5	Fire / smoke	58	Fire / smoke
6	Rotor guard	57	Rotor guard
7	Fan Common	56	Fan Common
8	Sensor	55	Sensor
9	Electrical heater O/H	54	Electrical heater O/H
10	Supply fan FC	53	Supply fan FC
11	Exhaust fan FC	52	Exhaust fan FC
12	Frost protection	51	Frost protection
13	HR Frost protection	50	HR Frost protection
14	LOW HRC efficiency	49	LOW HRC efficiency
15	Electric heater fire	48	Electric heater fire
16	Unit override	47	Unit override
17	Supply filter	46	Supply filter
18	Exhaust filter	45	exhaust filter
19	Not defined	44	Not defined
20	Not defined	43	Not defined
21	Not defined	42	Not defined
22	Not defined	41	Not defined
23	Not defined	40	Not defined
24	Not defined	39	Not defined
25	Not defined	38	Not defined
26	Not defined	37	Not defined
27	Not defined	36	Not defined
28	Not defined	35	Not defined
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 Chapter 6-9 for more information about each SNVT.

LON SNVT	Description	Alternative name
nviTemp00	Heating Setpoint Comfort	
nviTemp01	Heating Setpoint Economy	
nviTemp02	Cooling Setpoint Comfort (Dz Cooling Comfort)	
nviTemp03	Cooling Setpoint Economy (Dz Cooling Economy)	
nviTemp04	Not used	
nviTemp05	Outside Temperature	
nviPress00	Pressure Setpoint Supply Air Lowspeed	
nviPress01	Pressure Setpoint Supply Air Highspeed	
nviPress02	Pressure Setpoint Exhaust Air Lowspeed	
nviPress03	Pressure Setpoint Exhaust Air Highspeed	
nviFlow00	Flow Setpoint Supply Air Lowspeed	
nviFlow01	Flow Setpoint Supply Air Highspeed	
nviFlow02	Flow Setpoint Exhaust Air Lowspeed	
nviFlow03	Flow Setpoint Exhaust Air Highspeed	
nviSwitch00	Emergency stop	
nviResetAlarm	Reset / Acknowledge Alarm	
nviBMS	BMS Override Timeprogram	
nviActTime	Set Real Time Clock	
nvoTemp00	Actual Setpoint Temperature Heating	
nvoTemp01	Not used	
nvoTemp02	Not used	
nvoTemp03	Not used	
nvoTemp04	Not used	
nvoTemp05	Outside Temperature	
nvoTemp06	Supply Air Temperature	
nvoTemp07	Frost Temperature	
nvoTemp08	Room Temperature	
nvoTemp09	Exhaust Air Temperature	
nvoTemp10	HRC frost temperature	
nvoPress00	Supply Air Pressure	
nvoPress01	Exhaust Air Pressure	
nvoFlow00	Supply Air Flow	
nvoFlow01	Exhaust Air Flow	
nvoPerc00	Heating Valve	
nvoPerc01	Cooling Valve	
nvoPerc02	Heat Recovery	
nvoPerc03	HRC Efficiency	
nvoPerc04	Supply Air Fan Speed	
nvoPerc05	Exhaust Air Fan Speed	
nvoPerc06	Not used	
nvoPerc07	EI Heat battery	
nvoOpMode	Actual Operation Mode	
nvoSwitch00	Actual Fan Mode	
nvoUniState1	Status Outputs	
nvoUniState2	Status Inputs	
nvoAlarm	Alarms	

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