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**Firmenneutrale Datenkommunikation für die Gebäudeautomation und Gebäudemanagement –
Gebäude Netzwerk Protokoll –
Teil 6: Anwendungselemente;
Englische Fassung EN 14908-6:2010, nur auf CD-ROM**

Open Data Communication in Building Automation, Controls and Building Management –
Control Network Protocol –

Part 6: Application elements;

English version EN 14908-6:2010, only on CD-ROM

Réseau ouvert de communication de données pour l'automatisation la régulation et la
gestion technique du bâtiment –

Protocole de réseau pour le bâtiment –

Partie 6: Eléments pour l'application;

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Nationales Vorwort

Dieses Dokument (EN 14908-6:2010) wurde vom Technischen Komitee CEN/TC 247 „Gebäudeautomation und Gebäudemanagement“ erarbeitet, dessen Sekretariat vom SNV (Schweiz) gehalten wird.

Das zuständige deutsche Gremium ist der Arbeitsausschuss NA 041-03-68 AA „Gebäudeautomation und -kommunikation“ im Normenausschuss Heiz- und Raumluftechnik (NHRS) im DIN Deutsches Institut für Normung e. V.

In diesem Dokument (EN 14908-6:2010) werden für das Gebäude Netzwerk Protokoll die folgenden Anwendungselemente spezifiziert:

- Definition von standardisierten Paket-Datentypen (Netzwerkvariablen);
- Definition von Geräte-Schnittstellen Dateien;
- Definition von standardisierten Typen von Konfigurationseigenschaften;
- Definition von standardisierten Aufzählungstypen;
- Definition von standardisierten Funktions-Profilen;
- Definition einer standardisierten Methode zum Transferrieren einer Datei zwischen Geräten.

Ziel der Spezifikationen ist es, die Interoperabilität zwischen unterschiedlichen Implementierungen des Gebäude Netzwerk Protokolls sicherzustellen. Der Inhalt dieses Dokumentes befindet sich auf der beiliegenden CD-ROM.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird DIN EN 14908-6 in der Englischen Fassung veröffentlicht.

Der englische Originaltext dieses europäischen Norm-Entwurfs wurde unverändert übernommen. Das Präsidium des DIN hat mit seinem Beschluss 1/2004 festgelegt, dass von dem in den Regeln der europäischen Normungsarbeit von CEN/CENELEC verankerten Grundsatz, wonach Europäische Normen in den drei offiziellen Sprachen Deutsch, Englisch und Französisch veröffentlicht werden, in begründeten Ausnahmefällen abgewichen und auf die deutsche Sprachfassung verzichtet werden kann. Die Genehmigung dafür hat die DIN-Geschäftsleitung auf Antrag des NHRS als Ergebnis einer Einzelfallentscheidung erteilt, zumal bereits dieser Norm zugrunde liegende Papiere überwiegend in englischer Sprache auch von den deutschen Marktteilnehmern angewendet werden.

Die Normenreihe DIN EN 14908 besteht aus den folgenden Teilen unter dem Haupttitel *Firmenneutrale Datenkommunikation für die Gebäudeautomation und Gebäudemanagement — Gebäudedatennetzprotokoll*

- Teil 1: Datenprotokollschichtenmodell
- Teil 2: Kommunikation über paarig verdrehte Leitungen
- Teil 3: Kommunikation über die Stromversorgungsleitungen
- Teil 4: Kommunikation mittels Internet Protokoll (IP)
- Teil 5: Implementierung
- Teil 6: Anwendungselemente

English Version

Open Data Communication in Building Automation, Controls and
Building Management - Control Network Protocol - Part 6:
Application elements

Réseau ouvert de communication de données pour
l'automatisation, la régulation et la gestion technique du
bâtiment - Protocole de réseau pour le bâtiment - Partie 6 :
Éléments d'application

Firmenneutrale Datenkommunikation für die
Gebäudeautomation und Gebäudemanagement - Gebäude
Netzwerk Protokoll - Teil 6: Anwendungselemente

This European Standard was approved by CEN on 28 August 2010.

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Foreword

This document (EN 14908-6:2010) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard is part of the EN 14908 series, which consists of the following parts:

- EN 14908-1, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 1: Protocol Stack*
- EN 14908-2, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 2: Twisted Pair Communication*
- EN 14908-3, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 3: Power Line Channel Specification*
- EN 14908-4, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 4: IP Communication*
- EN 14908-5, *Open Data Communication in Building Automation, Controls and Building Management Implementation Guideline — Control Network Protocol — Part 5: Implementation*
- EN 14908-6, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 6: Application Elements*

The content of this European Standard covers the data communications used for management, automation/control and field functions.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is used by all involved in design, manufacture, engineering, installation and commissioning activities.

This document specifies the definition of various types of data-transfer containers for carrying temperature, pressure, state, and other forms of data over the protocol defined by EN 14908-1 from any number of devices to any other number of devices, as defined by the limits in EN 14908-1. This document also specifies the data types for configuration information, used to define timing, default values, and other data. This document also specifies a data-file transfer method that may be used for transferring configuration information to and from devices. This document also specifies the device-interface format that describes the interconnection points of a device.

NOTE The file-transfer mechanism is not exclusively for loading configuration information into a device and therefore it can be used for other purposes in addition.

This standard is contributing to the general European policy for energy savings – particularly in the field of the "Energy Performance of Building Directive" and the Construction Products Directive (ER No. 6 "Energy Economy and Heat Retention").

1 Scope

This European Standard provides mechanisms through which various vendors of building automation, control, and building management systems may exchange information in a standardised way.

This document provides specifications for the Application Elements of Control Network Protocol packets as follows:

- definitions of standardized packet (network-variable) data types;
- definitions of device-interface files;
- definitions of standardized configuration-property types;
- definitions of standardized enumeration types;
- definitions of standardized functional profiles;
- definition of the standardized method of file transfer between devices.

The purpose of this specification is to insure interoperability between various CNP implementations. This document contains all the information necessary to read and interpret the format of data and control information that is used by EN 14908-5. It also defines the device interface for a device as specified, which is necessary to exchange data between various devices from different manufacturers.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14908-1:2005, *Open Data Communication in Building Automation, Controls and Building Management — Building Network Protocol — Part 1: Protocol Stack*

EN 14908-2, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 2: Twisted Pair Communication*

EN 14908-3, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 3: Power Line Channel Specification*

EN 14908-4, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 4: IP Communication*

EN 14908-5, *Open Data Communication in Building Automation, Controls and Building Management Implementation Guideline — Control Network Protocol — Part 5: Implementation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14908-1:2005 and the following apply.

3.1

application set

functional block or functional blocks to which a configuration property applies

EXAMPLES A network variable, a series or compilation of network variables, a functional block, a series or compilation of functional blocks, or the entire device.

3.2

base type

fundamental type that can be used as the basis of a network-variable type or configuration-property type

NOTE The available base types are defined in EN 14908-5.

3.3

changeable-type network variable

network variable whose type can be changed during installation

3.4

CNP device

hardware and software that runs an application and communicates with other devices using the EN 14908-1 protocol

NOTE It may optionally interface with input/output hardware. A CNP device includes at least one processor and a CNP transceiver also called a CNP node, or simply a node.

3.5

CNP network

collection of intelligent devices that communicate with each other using the EN 14908-1 protocol over one or more communications channels

3.6

configuration property

CP

data value used to configure the application program in a device

NOTE Configuration properties are used to set parameters such as maximum, minimum, default, and override values. CPs are implemented using configuration network variables or as data items within configuration files. Configuration-property data are kept in a device's non-volatile memory.

3.7

configuration-property member

part of a functional profile

NOTE See 3.24.

3.8

configuration-property member number

part of a functional profile

NOTE See 3.25.

3.9

configuration-property type index

16-bit number that uniquely identifies a configuration-property type within the scope defined by the scope number and program-ID template of the resource file that contains the configuration-property type definition

3.10

device

logical and physical entity of the network containing an application that is designed to communicate with other logical and physical entities

3.11

device channel Identifier

number that optionally specifies the channel to which a device is attached

3.12

device class

two-byte field identifying the primary function of a device and part of the SPID of the device

3.13

device interface

network-visible interface to a device consisting of the unique node ID, program ID, channel ID, location field, device self-documentation string, device configuration properties, and functional blocks

3.14

device-location field

string or number that optionally specifies the location of a device

3.15

device self-documentation string

DSDS

string that specifies the structure of the contents of the self-documentation strings, the functional blocks, and optionally describes the function of a device

3.16

device subclass

two-byte field specifying the usage in the first byte and the channel type in the second byte and is part of the SPID of a device

NOTE See the usage and channel-type definitions.

3.17

dynamic functional block

functional block that is added to a device by a network tool after the device is installed

3.18

dynamic network variable

network variable that is added to a device by a network tool after the device is installed

3.19

format

<program ID> four-bit value defining the structure of the program ID as being a Standard Program Identifier (SPID) and device self-documentation string (DSDS) in the device

<resource file> string that provides formatting instructions for a network-variable or configuration-property type

3.20

functional block

fblock

portion of a device's application that performs a task by receiving configuration and operational data inputs, processing the data, and sending operational data outputs

NOTE A functional block may receive inputs from the network, from hardware attached to the device, and/or from other functional blocks on a device. A functional block may send outputs to the network, to hardware attached to the device, and/or to other functional blocks on the device. A functional block is an implementation of a functional profile. A "standard" functional block is one based on a standard functional profile template (SFPT).

3.21

functional-block index

sequentially assigned number identifying a functional-block implementation on a device

3.22

functional profile

FP

template that describes common units of functional behaviour, also known as profiles, or FPs; which can be represented with a machine-readable functional-profile template (FPT)

NOTE Each functional profile consists of a profile description and a specified set of network variables and configuration properties designed to perform a single function on a device. The network variables and configuration properties specified by the functional profile are called the functional-profile members. A functional profile specifies whether the implementation of each functional-profile member is mandatory or optional. A profile is uniquely identified by a program-ID template, scope, and functional-profile number.

3.23

functional-profile key

functional-profile number

NOTE See 3.26.

3.24

functional-profile member

network-variable or configuration-property member of a functional profile

NOTE Each functional-profile member is identified as mandatory or optional by the functional profile. Each member also includes a text description of the member for the functional profile.

3.25

functional-profile member number

two-byte number that uniquely identifies a network-variable or configuration-property member of a functional profile

NOTE This member number is used to associate a network variable or configuration property on a device with the corresponding network-variable or configuration-property member of the functional profile. Member numbers should be in the range of 1 to 4095, and need not be contiguous. Member numbers shall be unique, with the exception that network-variable and configuration-property members may use the same number (therefore, network-variable members' numbers should be unique, and configuration-property members' numbers should be unique, but they need not be unique between network-variable members and configuration-property members). There may be a maximum of 255 mandatory members and 255 optional members of each type (scope 0 NV, inheriting NV, scope 0 CP, and inheriting CP).

3.26

functional-profile number

two-byte number that uniquely identifies a functional profile within the scope defined by the scope number and program-ID template of the resource file that contains the functional-profile definition

NOTE Also called the functional-profile key, or the FPT key.

3.27

functional-profile selector

ASCII vertical bar ("|") or ASCII number sign ("#") to denote the association of a network variable or configuration property with a scope-0 profile or a profile of a higher-numbered scope, respectively, where a higher-numbered scope would denote the NV or CP was added to enhance a scope-0 profile or that it applies to a non-standard profile

NOTE If the functional profile selector is a vertical bar, the member number identifies a member of a scope-0 profile. If the functional profile selector is a number sign, the member number identifies a member of the inheriting profile. The number-sign functional profile selector is always used for members of user functional profiles, including profiles that do not use inheritance. The vertical-bar functional profile selector is always used for members of standard functional profiles. Two different functional profile members may have the same member number as long as they use different functional profile selectors.

EXAMPLE The "1" member of a functional profile is not the same as the "#1" member of the same profile. This prevents conflicts if new members are added to a standard functional profile that has already been used as the basis for inheriting profiles.

3.28

functional-profile template

functional profile in human- and machine-readable form

NOTE See 3.22.

3.29

global index

functional-block index

NOTE See 3.21.

3.30

inheriting profile

functional profile that inherits members from a scope-0 profile

3.31

interoperability

conditions that ensure multiple devices – from the same or different manufacturers – can be integrated into a single network without requiring custom device or tool development

3.32

manufacturer Identifier

MID

20-bit number that uniquely identifies the device manufacturer of a device and is part of the device's SPID

3.33

network-interface selection

form of network-variable selection that occurs on the network interface

3.34

network variable

NV

data item that a particular device application program expects to get from other devices on a network (an input network variable) or expects to make available to other devices on a network (an output network variable)

NOTE Network variable data are typically stored in a device's volatile memory.

EXAMPLES Examples are a temperature, switch value, and actuator-position setting.

3.35

network-variable declaration

establishment of an instance of a network variable type within the code of an application

3.36

network-variable index

sequentially assigned number identifying a network variable implementation on a device

NOTE For Neuron C applications, the index is assigned by the Neuron C compiler in the order of declaration. The first network variable on a device has index 0, the second index 1, etc.

3.37

network-variable member

functional-profile member that is a network variable

NOTE See 3.24.

3.38

network-variable member number

number of a functional-profile member that is a network variable

NOTE See 3.25.

3.39

network-variable programmatic name

name assigned to a network-variable implementation by the device application developer

NOTE The programmatic name is limited to 16 characters, including any optional prefixes. The programmatic name is not significant for interoperability, but conventions are suggested in EN 14908-5 to make programmatic names easier to use for integrators.

3.40

network-variable selection

process of associating a network-variable selector with a network variable on a device

3.41

network-variable type

specification of the length, units, valid range, and resolution of the data contained within a network variable

NOTE A network variable type may be a simple, one, two, or four-byte scalar type; or a more complex structure or union of up to 31 bytes.

3.42

network-variable type index

16-bit number that uniquely identifies a network-variable type within the scope defined by the scope number and program-ID template of the resource file that contains the network-variable type definition

3.43

unique node Identifier

UID

unique 48-bit identifier within the read-only data structure of a device as defined by the EN 14908-1 protocol

NOTE It is also called the `unique_node_ID`.

3.44

node

<common> device

<precise> physical and logical presence on a CNP network with a unique node ID and network address

NOTE The unique node ID relates to the identification of a single instance of an implemented EN 14908-1 protocol stack. A device is also a network presence with an application processor and one or more nodes. A device with multiple unique node IDs would consist of multiple nodes. Some infrastructure devices, such as routers, also consist of more than one unique node ID and thus consist of multiple nodes.

3.45

passive configuration tool

PCT

network tool that can be used on a device to assist in the successful commissioning of the device without disrupting the operation of other network tools

NOTE It may be a plug-in, standalone software, hardware attachment, or other tool. A passive configuration tool has attributes and capabilities as defined in EN 14908-5.

3.46

primary functional block

functional block on a device that implements the most important function for the device

3.47

primary functional profile

functional profile that defines the primary functional block on a device

3.48

proprietary data

data and message definitions in the device interface that are known only to the manufacturer and the manufacturer's agents

3.49

self-documentation string

SD string

text string associated with a device, network variable, or configuration property that is stored within a device and within the device interface (XIF) file for a device

NOTE Network tools can read the self-documentation strings from the device itself or from the device interface file.

3.50

self-documentation text

optional text within a device, network variable, or configuration property self-documentation string that provides documentation of the intended use of the device, network variable, or configuration property respectively for use by integrators

3.51

shared-media channel

communications channel where messages can leak between tools and devices belonging to different systems

3.52

SNVT_XXX

placeholder for SNVT (see definition of SNVT in section 4.1) chosen by the manufacturer – at the time of the device's development – for a network variable that is defined by a functional profile, but where the type for the network variable is not defined by the profile

3.53

standard configuration-property type

SCPT

configuration-property type that has been standardized by this document in 5.1

NOTE A SCPT is a standardized definition of the units, scaling, encoding, valid range, and meaning of the contents of configuration properties.

3.54

standard network-variable type

SNVT

network-variable type that has been standardized by this document in 4.1

3.55

standard program Identifier

SPID

eight-byte number that uniquely identifies the device interface for a device

NOTE Encoded according to rules specified in Annex B.

3.56

static functional block

functional block that is statically defined for a device; that is, a functional block that is not a dynamic functional block

3.57

static network variable

network variable that is statically defined for a device; that is, a network variable that is not a dynamic network variable

3.58

subsystem

two or more devices working together to perform a function and bearing fixed, pre-defined relationships to one another

NOTE A subsystem may use one or more EN 14908-1 domains.

3.59

successful commissioning

<noun> process of taking a device and integrating it into a network

<adjective> device can be physically installed in a network and made to perform its application function with the exclusive use of its device interface and a choice of third-party tools

3.60

system

one or more independently managed subsystems working together to perform a function

NOTE A system may use one or more EN 14908-1 domains.

3.61

unconfigured device

device without a valid network configuration

3.62

usage

one-byte value describing the intended usage of the device and is part of the SPID of a device

NOTE The usage field consists of a one-bit changeable-interface flag, a one-bit functional-profile-specific flag, and a 6-bit usage ID.

3.63

usage Identifier

six-bit value in the least-significant portion of the usage field that identifies the primary intended usage of a device

3.64

user data

non-standardized user functional blocks, user network variables, and user configuration properties used by a device manufacturer to augment the device interface

3.65

wink function

function provided by a device that allows a network integrator to physically identify the device

EXAMPLE A wink function may blink an LED on the device.

4 Standard network-variable type – SNVT

4.1 Introduction

CNP devices typically exchange data using network variables. Network variables greatly simplify the tasks of designing CNP application programs for interoperability with multiple vendors' products. A network variable is any data item (temperature, a switch value, or an actuator position setting) that a particular device application program expects to get from other devices on the network (an *input network variable*) or expects to make available to other devices on the network (an *output network variable*). When the application program has a changed value for an output network variable it simply passes the new value to the device firmware. Via a process that takes place during network design and installation called *binding*, the protocol stack is configured to know the logical address of the other devices or group of devices in the network expecting that network variable, and it assembles and sends the appropriate packets to these devices. Similarly, when the protocol stack receives an updated value for an input network variable required by its application program, it passes the data to the application program. The binding process thus creates logical *connections* between an output network variable in one device and an input network variable in another device or group of devices. Connections may be thought of as "virtual wires". Every network variable has a type that defines the units, scaling, and structure of the data contained within the network variable. Network variables shall be the same type to be connected. This prevents common installation errors from occurring such as a pressure output being connected to a temperature input. Type translators are available to convert network variables of one type to another type. This document defines standard network-variable types (SNVTs) that define commonly used types. Alternatively, manufacturers may define their own user network-variable types (UNVTs). UNVTs shall be documented in manufacturer-specific resource files.

Basic data types (e.g. signed long) and their sizes are defined in EN 14908-5.

4.2 SNVT_amp

Overview: Electric current in Amperes.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
1	2	signed long	-32768	32767	$1 * 10^{-1} * (Raw+0)$	0,1 Amperes

4.3 SNVT_amp_mil

Overview: Electric current in milliAmperes.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
2	2	signed long	-32768	32767	$1 * 10^{-1} * (Raw+0)$	0,1 milliAmperes

4.4 SNVT_angle

Overview: Angular distance in radians.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
3	2	unsigned long	0	65535	$1 * 10^{-3} * (Raw+0)$	0,001 radians

4.5 SNVT_angle_vel

Overview: Angular velocity in radians/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
4	2	signed long	-32768	32767	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 radians/second

4.6 SNVT_btu_kilo

Overview: Thermal energy in kilo-Btus.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
5	2	unsigned long	0	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 kilo-Btus

4.7 SNVT_btu_mega

Overview: Thermal energy in mega-Btus.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
6	2	unsigned long	0	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 mega-Btus

4.8 SNVT_char_ascii

Overview: ASCII character in 8-bit ASCII character.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
7	1	unsigned char	0	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 8-bit ASCII character

4.9 SNVT_count

Overview: Absolute count in units.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
8	2	unsigned long	0	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 units

4.10 SNVT_count_inc

Overview: Increment count in units (delta).

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
9	2	signed long	-32768	32767	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 units (delta)

4.11 SNVT_date_day

Overview: Day of week.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
11	1	days_of_week_t	-1	6	none (enumeration)	-1

4.12 SNVT_elec_kwh

Overview: Electrical energy in kiloWatt-hours.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
13	2	unsigned long	0	65535	$1 * 10^0 * (Raw+0)$	1 kiloWatt-hours

4.13 SNVT_elec_whr

Overview: Electrical energy in Watt-hours.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
14	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 Watt-hours

4.14 SNVT_flow

Overview: Flow volume in liters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
15	2	unsigned long	0	65535	$1 * 10^0 * (Raw+0)$	1 liters/second

4.15 SNVT_flow_mil

Overview: Flow volume in milliliters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
16	2	unsigned long	0	65535	$1 * 10^0 * (Raw+0)$	1 milliliters/second

4.16 SNVT_length

Overview: Length in meters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
17	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 meters

4.17 SNVT_length_kilo

Overview: Length in kilometers.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
18	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 kilometers

4.18 SNVT_length_micr

Overview: Length in micrometers (microns).

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
19	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 micrometers (microns)

4.19 SNVT_length_mil

Overview: Length in millimeters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
20	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 millimeters

4.20 SNVT_lev_cont

Overview: Continuous level in % of full level.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
21	1	unsigned short	0	200	$5 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,5 % of full level

4.21 SNVT_mass

Overview: Mass in grams.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
23	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 grams

4.22 SNVT_mass_kilo

Overview: Mass in kilograms.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
24	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 kilograms

4.23 SNVT_mass_mega

Overview: Mass in metric tons.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
25	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 metric tons

4.24 SNVT_mass_mil

Overview: Mass in milligrams.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
26	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 milligrams

4.25 SNVT_power

Overview: Power in Watts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
27	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 Watts

4.26 SNVT_power_kilo

Overview: Power in kiloWatts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
28	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 kiloWatts

4.27 SNVT_ppm

Overview: Concentration in ppm.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
29	2	unsigned long	0	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 ppm

4.28 SNVT_press

Overview: Pressure (gauge) in kiloPascals.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
30	2	signed long	-32768	32767	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 kiloPascals

4.29 SNVT_res

Overview: Electric resistance in Ohms.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
31	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 Ohms

4.30 SNVT_res_kilo

Overview: Electric resistance in kiloOhms.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
32	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 kiloOhms

4.31 SNVT_sound_db

Overview: Sound level in dB.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
33	2	signed long	-32768	32767	$1 \cdot 10^{-2} \cdot (\text{Raw}+0)$	0,01 dB

4.32 SNVT_speed

Overview: Linear velocity in meters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
34	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 meters/second

4.33 SNVT_speed_mil

Overview: Linear velocity in meters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
35	2	unsigned long	0	65535	$1 \cdot 10^{-3} \cdot (\text{Raw}+0)$	0,001 meters/second

4.34 SNVT_str_asc

Overview: Character string (30 characters max).

Index	Size in Bytes	CNP Data Type				
36	31	structure				
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution	
SNVT_str_asc.ascii			unsigned char	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
			(none)	0	1 array of 31 characters	

4.35 SNVT_str_int

Overview: Wide character string with locale code (15 characters max).

Index	Size in Bytes	CNP Data Type				
37	31	structure				
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution	
SNVT_str_int.char_set			unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
			(none)	0	1 code value	

SNVT_str_int.wide_char	unsigned long	65535	$1 * 10^0 * (Raw+0)$
	(none)	0	1 array of 15 wide characters

4.36 SNVT_telcom

Overview: Telecomm states.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
38	1	telcom_states_t	-1	20	none (enumeration)	-1

4.37 SNVT_temp

Overview: Temperature in degrees Celsius.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
39	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw-2740)$	0,1 degrees Celsius

4.38 SNVT_vol

Overview: Volume in liters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
41	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 liters

4.39 SNVT_vol_kilo

Overview: Volume in kiloliters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
42	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 kiloliters

4.40 SNVT_vol_mil

Overview: Volume in milliliters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
43	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 milliliters

4.41 SNVT_volt

Overview: Electric potential in Volts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
44	2	signed long	-32768	32767	$1 * 10^{-1} * (Raw+0)$	0,1 Volts

4.42 SNVT_volt_dbmv

Overview: Electric potential in dB microVolts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
45	2	signed long	-32768	32767	$1 * 10^{-2} * (Raw+0)$	0,01 dB microVolts

4.43 SNVT_volt_kilo

Overview: Electric potential in kiloVolts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
46	2	signed long	-32768	32767	$1 * 10^{-1} * (Raw+0)$	0,1 kiloVolts

4.44 SNVT_volt_mil

Overview: Electric potential in milliVolts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
47	2	signed long	-32768	32767	$1 * 10^{-1} * (Raw+0)$	0,1 milliVolts

4.45 SNVT_amp_f

Overview: Electric current in Amperes.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
48	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.46 SNVT_angle_f

Overview: Angular distance in radians.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
49	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.47 SNVT_angle_vel_f

Overview: Angular velocity in radians/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
50	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.48 SNVT_count_f

Overview: Absolute count in units.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
51	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.49 SNVT_count_inc_f

Overview: Increment count in units (delta).

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
52	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.50 SNVT_flow_f

Overview: Flow volume in liters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
53	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.51 SNVT_length_f

Overview: Length in meters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
54	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.52 SNVT_lev_cont_f

Overview: Continuous level in % of full scale.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
55	4	floating-point	0	100	floating	NAN and Out of Range

4.53 SNVT_mass_f

Overview: Mass in grams.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
56	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.54 SNVT_power_f

Overview: Power in Watts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
57	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.55 SNVT_ppm_f

Overview: Concentration in ppm.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
58	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.56 SNVT_press_f

Overview: Pressure (gauge) in Pascals.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
59	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.57 SNVT_res_f

Overview: Electric resistance in Ohms.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
60	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.58 SNVT_sound_db_f

Overview: Sound level in dBspl.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
61	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.59 SNVT_speed_f

Overview: Linear velocity in meters/second.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
62	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.60 SNVT_temp_f

Overview: Temperature in degrees Celsius.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
63	4	floating-point	-273,17001342773	3,4028234663853E+038	floating	NAN and Out of Range

4.61 SNVT_time_f

Overview: Elapsed time in seconds.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
64	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.62 SNVT_vol_f

Overview: Volume in liters.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
65	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.63 SNVT_volt_f

Overview: Electric potential in Volts.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
66	4	floating-point	-3,4028234663853E+038	3,4028234663853E+038	floating	NAN and Out of Range

4.64 SNVT_btu_f

Overview: Thermal energy in Btus.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
67	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.65 SNVT_elec_whr_f

Overview: Electrical energy in Watt-hours.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
68	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.66 SNVT_config_src

Overview: Network configuration source.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
69	1	config_source_t	-1	1	none (enumeration)	-1

4.67 SNVT_color

Overview: CIELAB color.

Index	Size in Bytes	CNP Data Type				
70	6	structure				
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution	
SNVT_color.L_star			unsigned long	1000	$1 * 10^{-1} * (Raw+0)$	
			(none)	0	0,1	
SNVT_color.a_star			signed long	2000	$1 * 10^{-1} * (Raw+0)$	
			(none)	-2000	0,1	
SNVT_color.b_star			signed long	2000	$1 * 10^{-1} * (Raw+0)$	
			(none)	-2000	0,1	

4.68 SNVT_grammage

Overview: Density in grams/sq meter.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
71	2	unsigned long	0	65535	$1 * 10^{-1} * (Raw+0)$	0,1 grams/sq meter

4.69 SNVT_grammage_f

Overview: Density in grams/sq meter.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
72	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.70 SNVT_file_req

Overview: File request.

Index	Size in Bytes	CNP Data Type			
73	12	structure			
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution
SNVT_file_req.request			file_request_t	6	none (enumeration)
			-1	-1	1
SNVT_file_req.index			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1 file index
SNVT_file_req.receive_timeout			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1 milliseconds
SNVT_file_req.dest_address			union		
SNVT_file_req.dest_address.addrt			structure		
			EN 14908-1 address in device's internal address table entry		
SNVT_file_req.dest_address.addrt.type			unsigned short	33	1* 10 ⁰ * (Raw+0)
			(none)	33	1 8-bit unsigned value
SNVT_file_req.dest_address.addrt.index			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1 16-bit unsigned value
SNVT_file_req.dest_address.sn			structure		
SNVT_file_req.dest_address.sn.type			unsigned short	1	1* 10 ⁰ * (Raw+0)
			(none)	1	1 8-bit unsigned value
SNVT_file_req.dest_address.sn.domain			bitfield	1	1* 10 ⁰ * (Raw+0)
				0	1 (bits: 1) (offset: 0)
SNVT_file_req.dest_address.sn.node			bitfield	127	1* 10 ⁰ * (Raw+0)

		0	1 (bits: 7) (offset: 1)
SNVT_file_req.dest_address.sn.retry	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_file_req.dest_address.sn.tx_timer	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_file_req.dest_address.sn.subnet	unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	0	0	1 subnet number
SNVT_file_req.dest_address.gp	structure		
SNVT_file_req.dest_address.gp.type	bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 0)
SNVT_file_req.dest_address.gp.size	bitfield	65	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 7) (offset: 1)
SNVT_file_req.dest_address.gp.domain	bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 0)
SNVT_file_req.dest_address.gp.unused	bitfield	0	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 7) (offset: 1)
SNVT_file_req.dest_address.gp.retry	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_file_req.dest_address.gp.tx_timer	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_file_req.dest_address.gp.group	unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	(none)	0	1
SNVT_file_req.auth_on	unsigned short	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	(none)	0	1 boolean
SNVT_file_req.prio_on	unsigned short	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	(none)	0	1 boolean

4.71 SNVT_file_status

Overview: File status.

Index	Size in Bytes	CNP Data Type			
74	27	structure			
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution
SNVT_file_status.status			file_status_t	11	none (enumeration)
			-1	-1	1
SNVT_file_status.number_of_files			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1 count
SNVT_file_status.selected_file			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1 file index
SNVT_file_status.adr			union		
SNVT_file_status.adr.descriptor			structure		
SNVT_file_status.adr.descriptor.file_info			signed char	127	1* 10 ⁰ * (Raw+0)
			(none)	-128	1 array of 16 characters
SNVT_file_status.adr.descriptor.size			s32_type (signed 32-bit type)	2147483647	1* 10 ⁰ * (Raw+0)
			(none)	0	1 bytes
SNVT_file_status.adr.descriptor.type			unsigned long	65535	1* 10 ⁰ * (Raw+0)
			(none)	0	1
SNVT_file_status.adr.address			structure		
SNVT_file_status.adr.address.domain_id			unsigned short	255	1* 10 ⁰ * (Raw+0)

	(none)	0	1 array of 6 bytes
SNVT_file_status.adr.address.domain_length	unsigned short	6	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	(none)	0	1
SNVT_file_status.adr.address.subnet	unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	0	0	1 subnet number
SNVT_file_status.adr.address.node	unsigned short	127	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
	0	0	1 node number

4.72 SNVT_freq_f

Overview: Frequency in Hertz.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaled Value	Invalid
75	4	floating-point	0	3,4028234663853E+038	floating	NAN and Out of Range

4.73 SNVT_freq_hz

Overview: Frequency in Hertz.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
76	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 Hertz

4.74 SNVT_freq_kilohz

Overview: Frequency in kiloHertz.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
77	2	unsigned long	0	65535	$1 \cdot 10^{-1} \cdot (\text{Raw}+0)$	0,1 kiloHertz

4.75 SNVT_freq_milhz

Overview: Frequency in miliHertz.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
78	2	unsigned long	0	65535	$1 \cdot 10^{-4} \cdot (\text{Raw}+0)$	0,0001 Hertz

4.76 SNVT_lux

Overview: Illumination in lux.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
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79	2	unsigned long	0	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	1 lux
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4.77 SNVT_lev_percent

Overview: Percentage level in % of full level. Level percent. SNVT_switch should be used instead of SNVT_lev_percent, with the exception of network variables that are used to communicate a percentage value and that require the additional resolution provided by SNVT_lev_percent; or for network variable members of functional profiles that are designed primarily for interfacing with SNVT_lev_percent members of other profiles.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
81	2	signed long	-32768	32767	$5 \cdot 10^{-3} \cdot (\text{Raw}+0)$	0,005 % of full level

4.78 SNVT_multiplier

Overview: Multiplier.

Index	Size in Bytes	CNP Data Type	Minimum	Maximum	Scaling	Resolution
82	2	unsigned long	0	65535	$5 \cdot 10^{-4} \cdot (\text{Raw}+0)$	0,0005 16-bit unsigned value

4.79 SNVT_state

Overview: State vector. Each state is a boolean single bit value. SNVT_state_64 is preferred.

Index	Size in Bytes	CNP Data Type				
83	2	structure				
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution	
SNVT_state.bit0			bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
				0	1 (bits: 1) (offset: 0)	
SNVT_state.bit1			bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
				0	1 (bits: 1) (offset: 1)	
SNVT_state.bit2			bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
				0	1 (bits: 1) (offset: 2)	
SNVT_state.bit3			bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
				0	1 (bits: 1) (offset: 3)	
SNVT_state.bit4			bitfield	1	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	

		0	1 (bits: 1) (offset: 4)
SNVT_state.bit5	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 5)
SNVT_state.bit6	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 6)
SNVT_state.bit7	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 7)
SNVT_state.bit8	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 0)
SNVT_state.bit9	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 1)
SNVT_state.bit10	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 2)
SNVT_state.bit11	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 3)
SNVT_state.bit12	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 4)
SNVT_state.bit13	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 5)
SNVT_state.bit14	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 6)
SNVT_state.bit15	bitfield	1	$1 * 10^0 * (\text{Raw}+0)$
		0	1 (bits: 1) (offset: 7)

4.80 SNVT_time_stamp

Overview: Time stamp.

Index	Size in Bytes	CNP Data Type			
84	7	structure			
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution
SNVT_time_stamp.year			signed long	3000	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			-1	-1	1 years
SNVT_time_stamp.month			unsigned short	12	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 months
SNVT_time_stamp.day			unsigned short	31	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 days
SNVT_time_stamp.hour			unsigned short	23	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 hours
SNVT_time_stamp.minute			unsigned short	59	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 minutes
SNVT_time_stamp.second			unsigned short	59	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 seconds

4.81 SNVT_zerospans

Overview: Zero and span. Linear transformation parameters: multiply by the span-factor, then add the zero-term.

Index	Size in Bytes	CNP Data Type			
85	4	structure			
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution
SNVT_zerospans.zero			signed long	32767	$5 \cdot 10^{-3} \cdot (\text{Raw}+0)$
			(none)	-32768	0,005 16-bit signed value

SNVT_zerospan.span	unsigned long	65535	$5 \cdot 10^{-4} \cdot (\text{Raw}+0)$
	(none)	0	0,0005 16-bit unsigned value

4.82 SNVT_magcard

Overview: ISO 7811 magnetic card stripe data.

Index	Size in Bytes	CNP Data Type	
86	20	structure	
Field		CNP Data Type / Invalid Value	Maximum / Minimum Scaled Value / Resolution
SNVT_magcard.digit1		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			11 1 (bits: 4) (offset: 0)
SNVT_magcard.digit2		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 4)
SNVT_magcard.digit3		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 0)
SNVT_magcard.digit4		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 4)
SNVT_magcard.digit5		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 0)
SNVT_magcard.digit6		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 4)
SNVT_magcard.digit7		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 0)
SNVT_magcard.digit8		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 4)
SNVT_magcard.digit9		bitfield	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			15 0 1 (bits: 4) (offset: 0)

SNVT_magcard.digit10	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit11	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit12	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit13	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit14	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit15	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit16	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit17	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit18	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit19	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit20	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit21	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit22	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)

SNVT_magcard.digit23	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit24	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit25	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit26	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit27	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit28	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit29	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit30	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit31	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit32	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit33	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit34	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit35	bitfield	15	$1 * 10^0 * (Row+0)$
		0	1 (bits: 4) (offset: 0)

SNVT_magcard.digit36	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit37	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit38	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)
SNVT_magcard.digit39	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 0)
SNVT_magcard.digit40	bitfield	15	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
		0	1 (bits: 4) (offset: 4)

4.83 SNVT_elapsed_tm

Overview: Elapsed time.

Index	Size in Bytes	CNP Data Type			
87	7	structure			
Field		CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution	
SNVT_elapsed_tm.day		unsigned long	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
		65535	0	1 days	
SNVT_elapsed_tm.hour		unsigned short	23	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
		(none)	0	1 hours	
SNVT_elapsed_tm.minute		unsigned short	59	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
		(none)	0	1 minutes	
SNVT_elapsed_tm.second		unsigned short	59	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
		(none)	0	1 seconds	
SNVT_elapsed_tm.millisecond		unsigned long	999	$1 \cdot 10^0 \cdot (\text{Raw}+0)$	
		(none)	0	1 milliseconds	

4.84 SNVT_alarm

Overview: Alarm status.

Index	Size in Bytes	CNP Data Type			
88	29	structure			
Field			CNP Data Type / Invalid Value	Maximum / Minimum	Scaled Value / Resolution
SNVT_alarm.location			unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 array of 6 bytes
SNVT_alarm.object_id			unsigned long	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 object index
SNVT_alarm.alarm_type			alarm_type_t	32	none (enumeration)
			-1	-13	1
SNVT_alarm.priority_level			priority_level_t	11	none (enumeration)
			-1	-1	1
SNVT_alarm.index_to_SNVT			unsigned long	65535	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 index of NV causing alarm
SNVT_alarm.value			unsigned short	255	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 array of 4 bytes
SNVT_alarm.year			unsigned long	3000	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 years
SNVT_alarm.month			unsigned short	12	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 months
SNVT_alarm.day			unsigned short	31	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 days
SNVT_alarm.hour			unsigned short	23	$1 \cdot 10^0 \cdot (\text{Raw}+0)$
			(none)	0	1 hours
SNVT_alarm.minute			unsigned short	59	$1 \cdot 10^0 \cdot (\text{Raw}+0)$