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SNVT and SCPT Master List

LONMARK®
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ISO/IEC 14908-1 devices (commonly known as devices for the LONWORKS® controls-networking platform) typically exchange data using *network variables*. Network variables greatly simplify the tasks of designing 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 device firmware is configured to know the logical address of the other devices or group of devices in the network that are expecting that network variable. It then assembles and sends the appropriate packets to these devices. Similarly, when the device firmware 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 must 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*, pronounced "sniv'-its") that define commonly used types. Alternatively, manufacturers may define their own *user network-variable types* (*UNVTs*, pronounced "you-niv'-its"). Network variables are used for operational communication between devices.

Besides that type of communication, most devices also require customization for a specific system application. *Configuration properties* provide a standard mechanism that can be used by network tools to download customization data to an ISO/IEC 14908-1 device. This document also defines a standard set of configuration property types; these are called *standard configuration-property*

types (*SCPTs*, pronounced “skip'-its”). Manufacturers may also define their own configuration property types; these are called *user configuration-property types* (*UCPTs*, pronounced “you-keep'-its”). SCPTs are defined for a wide range of configuration properties used in many kinds of controllers, sensors, and actuators that have had their functions profiled (“functional profiles”), such as hysteresis bands, default values, minimum and maximum limits, gain settings, and delay times. SCPTs are to be used wherever applicable. In situations where there is not an appropriate SCPT available, manufacturers may define UCPTs for configuring their devices, but these must be documented in manufacturer-specific resource files.

Each SNVT and SCPT is a scalar or structure type. A scalar type represents a single value that is a fixed-point number, floating-point number, or enumeration. A structure is a set of one or more scalar values, embedded structures, arrays, and/or unions. Each scalar type may define a minimum and maximum range, called the *valid range*. The limits for the valid range depend on the scalar type selected, with limits as defined in the following table.

Type	*Maximum Valid Range*	*Binary Digits (bits)*
Enumeration	–128 .. 127	8
Signed Short	–128 .. 127	8
Unsigned Short	0 .. 255	8
Unsigned Char	0 .. 255	8
Signed Long	–32,768 .. 32,767	16
Unsigned Long	0 .. 65,535	16
Signed Quad	–2,147,483,648 .. 2,147,483,647	32
Unsigned Quad	0 .. 4,294,967,295	32
Single-Precision Floating Point	–3.402823466E+38 .. 3.402823466E+38	32
Signed Int64	–9,223,372,036,854,775,808 .. 9,223,372,036,854,775,807	64
Unsigned Int64	0 .. 18,446,744,073,709,551,615	64
Double-Precision Floating Point	–1.7976931348623157E+308 .. 1.7976931348623157E+308	64

The representation for floating-point types is ISO/IEC/IEEE 60559 (based on IEEE 754):

Single-precision floating points have 1 sign bit, 8 exponent bits, and 23 mantissa bits, for a total of 32 bits. The single-precision floating-point data type is compatible with the float_type defined by Neuron C. The ranges are:

–3.402823466E+38 .. –1.175494351E-38;

0; and

1.175494351E-38 .. 3.402823466E+38

Double-precision floating points have 1 sign bit, 11 exponent bits, and 52 mantissa bits, for a total of 64 bits. The double-precision floating-point data type is compatible with the double_float defined by Neuron C.

–1.7976931348623157E+308 .. –2.2250738585072014E-308;

0; and

2.2250738585072014E-308 .. 1.7976931348623157E+308

The representation for enumeration types is a single byte representing a value from an enumeration list. Standard enumeration types are defined in a separate enumeration master list.

Functional profiles are used to define the functional behavior of SNVTs and SCPTs. Functional profiles define mandatory and optional network variables and configuration properties, and the type to be used for each. Functional profiles may define a simple function such as a sensor or actuator, or may define a more complex function such as a space comfort controller or scheduler. Many standard functional profiles are defined at www.lonmark.org/profiles; manufacturers may also define manufacturer-specific, or user functional profiles.

Resource files provide a standard mechanism to document types and profiles for use by network tools. The *LONMARK Resource Files* file set defines SNVTs, SCPTs, standard enumeration types, and standard functional profiles. This document defines the SNVT, SCPT, and enumeration types contained in the standard resource file set, and is a part of the *LONMARK Resource Files 15.00* installer available at www.lonmark.org/lmrf. Functional profile documents available at www.lonmark.org/profiles define the standard functional profiles defined in the LONMARK standard resource file set.

Master Lists

The LonMark SNVTs, SCPTs, and standard enumeration types are defined in the following documents:

SNVT Master List.

SCPT Master List.

Standard Enumeration Master List.

To search for types, open the appropriate document first, and then search for the type.