

MNEMONIC . 2 . SAMPLE . 3 . TIME-STAMP
MNEMONIC . 2 . SAMPLE . 3 . RAW-VALUE

Note that “n” starts with “1”.

Required, Optional, Dependent and Tracking

Fields are classified as Required, Optional, Dependent, or Tracking. The required fields must be present in order to be compliant with C2MS.

An optional field may or may not be included in a message. Optional fields may be useful to the Receiver and may be implemented as necessary. Software components, missions, or interface definitions may determine if these fields are required for their particular needs and applications.

Dependent fields are actually required for a certain Message Type or are dependent on another field being present. This information will be documented in the specific Message section where applicable.

The tracking fields are those that are reserved for use by the implementing software and thus any user supplied data in these fields may be overwritten.

Value

Some fields must contain specific values in order to be C2MS compliant. If no value is specified, the value of the Field Name is variable; however, it must conform to the specified Type. See the Type description in the next section.

Type

The Field Type is the data type. Cross-platform compatibility is achieved using the defined field types listed below. The intention is for the client application to not have to deal with byte-swapping or other number format changes. Type definitions are based on the Institute of Electrical and Electronics Engineers (IEEE) standards. Time field types are based on the ISO 8601 standards.

Following each message diagram, additional information is presented for each field in the message in the format of a table that adds information about the values and any important notes about the field.

Table 8-1. Field Type Definitions

Field Type	Definition	Range/Comments
Binary [Blob]	0 or more of any combination of bytes, integers, floating points, doubles, time, and strings.	Its structure may be dependent upon message type, message subtype, or application generating the message.
Boolean (1)	False/true, no/yes	[0, 1]
Character	Native single ASCII character representation	[0, 127]

Field Type	Definition	Range/Comments
F32 Float (3)	32-bit single precision floating point representation	32 bits composed of 23 bits for the fraction, 8 bits for the exponent, and 1 sign bit. (See IEEE 754)
F64 Double (3)	64-bit double precision (extended) floating point representation	64 bits composed of 52 bits for the fraction, 11 bits for the exponent, and 1 sign bit. (See IEEE 754)
Header string	Any combination of an UPPERCASE alphanumeric, "-" (dash), and "_" (underscore) characters.	This field type requires fields also used as subject name elements to be uniformly UPPERCASE
I16 Short (3)	16-bit signed integer representation	$[-2^{15}, 2^{15} - 1]$ 16 bits.
I32 Long (3)	32-bit signed integer representation	$[-2^{31}, 2^{31} - 1]$ 32 bits.
I64 Longlong (2,3)	64-bit signed integer representation	$[-2^{63}, 2^{63} - 1]$ 64 bits.
String	0 or more ASCII characters	Also, see Header string.
Time	String representation of time	See Table 8-2 Ordinal Date and Time Field Type Definition
U16 UShort (3)	16-bit unsigned integer representation	$[0, 2^{16} - 1]$ 16 bits, no sign bit
U32 ULong (3)	32-bit unsigned integer representation	$[0, 2^{32} - 1]$ 32 bits, no sign bit
U64 ULonglong (3)	64-bit unsigned integer representation	$[0, 2^{64} - 1]$ 64 bits, no sign bit
Variable	Field could be any data type	User needs to ascertain the data type of the field prior to accessing the value (e.g. with a function call)

Notes:

1. "Boolean" - The C2MS defines the *value* of the Boolean field to be 0 (zero) or 1. The *description* or meaning of the value can take various forms, such as no/yes, false/true, disabled/enabled, in-limits/out-of-limits, active/static, and so on. It is important to take into account that some programming and scripting languages (e.g., Java), schemas, commercial products, and custom software will only interpret the *value* of a Boolean field to be false/true.
2. Field types larger than 32 bits may not be available on 32-bit architecture platforms.
3. In support of both 32-bit and 64-bit architecture platforms for various equipment manufacturers, these ambiguous terms are targeted for future deprecation.

Table 8-2 below describes some of the commonly used time formats. The "Time" format is the only data type specified in C2MS messages. Other formats are included for reference. Time formats generally are based on Coordinated Universal Time (UTC).