1 Overview

The Ciholas Data Protocol (CDP) provides a method of communication between devices and services. CDP data is transmitted over ethernet as User Datagram Protocol (UDP) packets. Ciholas Real-Time Location Systems (RTLS) emit position data using the CDP format as an accessible way for users to gain access to the data and integrate their software.

CDP packets are transmitted through CDP Streams. CDP Streams are identified by the Ethernet interface, IP address, and Port through which the packet is sent. Streams are allowed to be both multicast and unicast. Different CDP Streams may be defined to distinguish different categories or classes of data.

> This Ciholas Data Protocol is only for v5.0 CUWB Version. The v5.0 CDP Version is not compatible with older databases or legacy Ciholas hardware. Legacy documentation is available in our legacy area.

2 Data Format

2.1 Endianness

All CDP numerical fields of length 2, 4, and 8 bytes are transmitted using little-endian format.

> CDP does not utilize network byte order.

The CDP format utilizes little-endian format in order to reduce overhead and complexity when transmitting or receiving packets. The overall effect is decreased processor usage as well as increasing confidence for developers through eliminating the need to byte swap data before usage.

> CDP fields containing ASCII strings are not byte-swapped.

2.2 Scale Conversion

When a scale value is supplied for a 2s compliment field, the scale value represents the maximum value in the given units for the maximum integer. Conversion can be done to get the unit based value with floating point math:

$$\frac{value \cdot scale}{maxint}$$

Value Size	Max Int
1	127
2	32767
4	2147483647

2.3 CDP Packet Structure

A CDP Packet is made up of a CDP Packet Header followed a list of CDP Data Items.

2.4 CDP Packet Header

Field Name	Byte Length	Type	Description
MARK	4	uInt32	The 4 byte magic word (0x3230434C in little endian).
SEQUENCE	4	uInt32	The sequence number of the CDP packet. The sequence number is incremented on every transmission from a given CDP Stream.
STRING	8	str	An ASCII string of “CDP0002” with a null terminator.
SERIAL NUMBER	4	uInt32	The unique ID of the reporting device. If the reporting device does not have a serial number or it is unknown, 0 is used.

2.5 Data Items

All CDP Data Items start with a 4 byte CDP Data Item Header followed by 0 to 65535 bytes of data.

2.5.1 CDP Data Item Header

Field Name	Byte Length	Type	Description
TYPE	2	uInt16	The type of the CDP Data Item.
SIZE	2	uInt16	The size of the Data Item not including the Data Item Header.

2.5.2 Shared Structures

Shared structures are combinations of data that are commonly found in a CDP data items. The following definitions are combinations of data that are commonly used within the CDP Data Items.

Cartesian Coordinates

This shared structure contains the X, Y, and Z coordinates for location data.

Field Name	Byte Length	Type	Description
X	4	Int32	The distance in millimeters from the location along the X axis. This value is a signed two’s complement integer.
Y	4	Int32	The distance in millimeters from the location along the Y axis. This value is a signed two’s complement integer.
Z	4	Int32	The distance in millimeters from the location along the Z axis. This value is a signed two’s complement integer.

Signal Strength

This shared structure contains the receive signal strength information supplied by the UWB chip on a UWB reception. This is used in the calculation of signal strength and signal quality.

Field Name	Byte Length	Type	Description
FP AMPL1	2	uInt16	The First Path Amplitude 1 of the reception.
FP AMPL2	2	uInt16	The First Path Amplitude 2 of the reception.
FP AMPL3	2	uInt16	The First Path Amplitude 3 of the reception.
RXPACC	2	uInt16	The Received Preamble Accumulation of the reception.
CIR POWER	2	uInt16	The Channel Impulse Response Power of the reception.
STD NOISE	2	uInt16	The Standard Noise of the reception.

3 Unknown Data Items

CDP Streams may contain data items not documented here. These data items should be skipped over in case there are known data items appearing later in the same CDP packet.

4 Known Data Items

4.1 0x010C - Deliver User Data V1

This data type is used to send User Data through the CUWB RTLS. This data type is used both when sending data from the Tag to the CUWBNet as well as when sending data from the CUWBNet to the Tag.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the desired recipient.
PAYLOAD	X	Byte Array	Variable length byte array. The format of the contents are defined by the user.

4.2 0x010D - Node Status Change V2

This data type is used to report when the status for a node has changed.

Field Name	Byte Length	Type	Description
NODE SERIAL NUMBER	4	uInt32	The serial number of the node.
NODE INTERFACE IDENTIFIER	1	uInt8	The interface identifier of the node.
NODE STATUS	1	uInt8	Inactive = 0x01

4.3 0x011A - CDP Stream Information

This datatype is used to send the information that defines a stream the server is using.

Field Name	Byte Length	Type	Description
DESTINATION IP ADDRESS	4	uInt32	The IP address of this stream.
DESTINATION PORT	2	uInt16	The port of this stream.
INTERFACE IP	4	uInt32	The interface ip address for this stream.
INTERFACE NETMASK	4	uInt32	The interface netmask for this stream.
INTERFACE PORT	2	uInt16	The interface/listening port being used by the net app. 0 indicates this field is not being used.
TTL	1	uInt8	The ttl of this stream.
STREAM NAME	X	str	Variable Length, not null terminated. The name for this stream.

4.4 0x011B - Hostname Announce

This datatype is used to send the hostname of the computer that is running the server.

Field Name	Byte Length	Type	Description
HOSTNAME	X	str	Variable length, not null terminated. The hostname of the sending computer.

4.5 0x011C - Instance Announce

This datatype is used to send the instance name (name of database file) for the server.

Field Name	Byte Length	Type	Description
INSTANCE NAME	X	str	Variable length, not null terminated. The instance name (name of database file) for the sending net app.

4.6 0x0127 - Distance V2

This data type is used to transmit the distance data from two devices.

Field Name	Byte Length	Type	Description
SERIAL NUMBER 1	4	uInt32	The serial number of the first device.
SERIAL NUMBER 2	4	uInt32	The serial number of the second device.
INTERFACE IDENTIFIER 1	1	uInt8	The interface identifier of the first device.
INTERFACE IDENTIFIER 2	1	uInt8	The interface identifier of the second device.
RX TIMESTAMP	8	uInt64	Time at which the last packet was received.
DISTANCE	4	uInt32	The distance, in millimeters, between the two devices.
QUALITY	2	uInt16	The quality of the computed distance.

4.7 0x0135 - Position V3

This data type is used to report the 3 dimensional position of the reporting device.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the reporting device.
NETWORK TIME	8	uInt64	The timestamp when the sensor recorded the data. This value is represented in Network Time, which is roughly 15.65 picoseconds per tick.
COORDINATES	12	struct	See Cartesian Coordinate for details. The coordinates from the origin (0, 0, 0).
QUALITY	2	uInt16	The quality of the computed position, with 0 being an assessment of poor quality and 10,000 being an assessment of perfect quality.
ANCHOR COUNT	1	uInt8	The number of anchors involved in the calculation of this position.
FLAGS	1	uInt8	Reserved for future use.
SMOOTHING	2	uInt16	The effective smoothing factor (the number of positions averaged minus 1).

4.8 0x0137 - Device Activity State

This data type is used to report the current state of a device on the network.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The infrastructure node's serial number
INTERFACE IDENTIFIER	1	uInt8	The infrastructure node's interface identifier.
COORDINATES	12	struct	See Cartesian Coordinate for details. The coordinates from the origin (0, 0, 0) for the last known position of the device.
ROLE ID	1	uInt8	The identifier for the role this device is currently functioning as. Pair with the Role Report to match this identifier to the role's name.
CONNECTIVITY STATE	1	uInt8	See Device Connectivity State for details.
SYNCHRONIZATION STATE	1	uInt8	See Device Synchronization State for details.

4.8.1 Device Connectivity State

This is a listing of what the bits in the CONNECTIVITY STATE field represent, starting from the lowest bit. Any bits not listed are currently unused.

Bit Position	Flag	Description
0	Ethernet	Set to 1 when the device has ethernet connectivity to the CUWB Network Application.
1	UWB	Set to 1 when the device has UWB connectivity to the rest of the CUWB Network.

4.8.2 Device Synchronization State

This is a listing of what the bits in the SYNCHRONIZATION STATE field represent, starting from the lowest bit. Any bits not listed are currently unused.

> The only devices with a synchronization state are anchors. Thus, this field can be ignored for tags.

Bit Position	Flag	Description
0	TX	Set to 1 when the device is Transmit Synchronized, which indicates that it can be used to spread synchronization to other anchors.
1	RX	Set to 1 when the device is Receive Synchronized, which indicates that it can be used in tag position calculations.

4.9 0x0149 - Network Time

This data type is used to report network time of the network.

Field Name	Byte Length	Type	Description
SERVER INSTANCE	4	uInt32	The server instance this packet is intended for.
NT64_0	8	uInt64	The Network Time when this packet was transmitted.
NT QUALITY	1	uInt8	The Network Time quality value at the time of this packet transmission.

4.10 0x80D4 - Device Status V3

This data type contains information about the current states of a device.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the reporting device.
MEMORY	4	uInt32	How much memory is free on the device.
FLAGS	4	uInt32	See Device Hardware Status Flags for details.
MINUTES REMAINING	2	uInt16	When charging (FLAGS.Charging=1) this indicates the estimate of minutes until the device is fully charged. When discharging (FLAGS.charging=0) this indicates the estimate of minutes until the device is fully discharged. When 65535, the time remaining is unknown.
BATTERY PERCENTAGE	1	uInt8	Percentage of battery charge left from 0-100. A value of 255 means no measurable battery is present.
TEMPERATURE	1	uInt8	2s compliment temperature in degrees Celsius.
PROCESSOR USAGE	1	uInt8	Percentage of processor usage from 0-100. A value of 255 represents an unknown value.
MISSED PHASED PACKETS	2	uInt16	Count of packets missed while phased.
MISSED RECOVERY PACKETS	2	uInt16	Count of packets missed while recovering command phasing.
MAX WIDENING FACTOR USED	2	uInt16	Highest receive window widening factor used to recover phasing.
ERROR PATTERN	X	array	Array of current error states by their LED pattern. See Device Hardware Status Error Patterns for details.

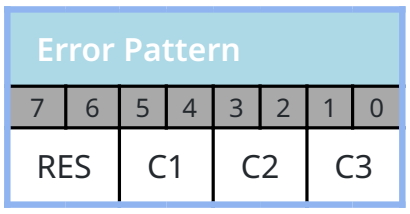
4.10.1 Device Hardware Status Flags

This is a listing of what the bits in the FLAGS field represent, starting from the lowest bit. Any bits not listed are currently unused.

Bit Position	Flag	Description
0	Powered	Set to 1 when the device has power from an external source
1	Charging	Set to 1 when the device is charging the battery

4.10.2 Device Hardware Status Error Patterns

The ERROR PATTERN field is an array of patterns. Each pattern is a single byte made of three 2-bit color codes. The patterns correspond the to the errors being indicated by the devices LEDs. Error codes can be found in device datasheets.



Field	Length	Description
RES	2 bits	Reserved
C1	2 bits	The first color code
C2	2 bits	The second color code
C3	2 bits	The third color code

Color Code	Color
0	White
1	Yellow
2	Blue
3	Green

4.11 0x013F - Device Names

This data type is used to report the device names.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the device.
NAME	X	str	Variable length string, not null terminated. The name of the device provide in the CUWB Manager.

4.12 0x0140 - Synchronization

This data type is used to report current synchronization counts.

Field Name	Byte Length	Type	Description
MAX TX SYNC COUNT	2	uInt16	The maximum possible number of anchors that can be Transmit Synchronized on this network.
CURRENT TX SYNC COUNT	2	uInt16	The current number of anchors that are Transmit Synchronized on this network.
MAX RX SYNC COUNT	2	uInt16	The maximum possible number of anchors that can be Receive Synchronized on this network.
CURRENT RX SYNC COUNT	2	uInt16	The current number of anchors that are Receive Synchronized on this network.

4.13 0x0141 - Role Report

This data type is used to track the number of devices on a particular role.

Field Name	Byte Length	Type	Description
ROLE ID	2	uInt16	The identifier of the given role.
MAX QUANTITY	2	uInt16	The maximum number of devices that are configured to the given role.
ACTIVE QUANTITY	2	uInt16	The current number of devices that are actively participating in the network as a member of the given role.
ROLE NAME	X	str	Variable length, not null terminated. The name of the given role.

4.14 0x0148 - User Defined V2

This data type is used to report any user defined data bytes.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the device sending the user-defined data.
PAYLOAD	X	Byte Array	Variable length byte array. The format of the contents are defined by the user.

4.15 0x014A - Anchor Health Information V5

This data type is used to report the health of anchors in the network.

Field Name	Byte Length	Type	Description
ANCHOR SERIAL NUMBER	4	uInt32	The serial number of the anchor.
ANCHOR INTERFACE IDENTIFIER	1	uInt8	The interface identifier of the anchor.
TICKS REPORTED	4	uInt32	The total quantity of anchor ticks that were reported by the anchor since the last Anchor Health Information.
TIMED RXS REPORTED	4	uInt32	The total quantity of anchor timed rxs that were reported by the anchor since the last Anchor Health Information.
BEACONS REPORTED	4	uInt32	The total quantity of tag beacons that were reported by the anchor since the last Anchor Health Information.
BEACONS DISCARDED	4	uInt32	The total quantity of tag beacons that were discarded from the anchor since the last Anchor Health Information.
BEACONS LATE	4	uInt32	The total quantity of tag beacons that were late from the anchor since the last Anchor Health Information.
AVERAGE QUALITY	2	uInt16	The average of the quality number from 0 to 10,000; with 0 being poor quality, 10,000 being high quality for the anchor since the last Anchor Health Information.
REPORT PERIOD	1	uInt8	Period of the packet in seconds.
INTER-ANCHOR COMMS ERROR CODE	1	uInt8	See Inter Anchor Comms Error Code for details.
BAD PAIRED ANCHORS	X	struct array	Variable length. An array of Full Device ID structures. These specify the neighboring anchors that this anchor is having trouble communicating with.

4.15.1 Inter Anchor Comms Error Code

Indicates whether there are any problems with inter-anchor communications involving this anchor. Any neighboring anchors involved in poor communications with this anchor are listed in the BAD PAIRED ANCHORS array. The error code will give an indication as to the severity of the current communications problems. Possible error codes are as follows:

Error Code	Name	Description
0	No Error	The anchor appears to be successfully communicating with all of its neighbors.
1	Blacklisting	This anchor has poor comms to some of its neighbors. It is recommended that blacklist pairs are created between this anchor and all of the BAD PAIRED ANCHORS so they do not hinder each other's performance.
2	Bad Survey	This anchor has poor comms to all of its neighbors. This is most often caused by poor survey, so it is recommended that the device is re-surveyed. If it has a proper survey, then the next most likely cause of this issue is some sort of UWB interference, for which the recommended solution is to move the device to a new location in order to avoid the interferer.

4.15.2 Full Device ID

This structure specifies the full identifier for a device, including both its serial number and interface identifier.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the device.
INTERFACE IDENTIFIER	1	uInt8	The identifier of the interface of the device.

4.16 0x014C - Global Ping Timing Report V1

This data type is used to track the amount of relative delay between ping receptions from different anchors for the same tag transmission.

Field Name	Byte Length	Type	Description
INITIAL PING COUNT	4	uInt32	The number of starting pings that were received (and thus the number of positions that were calculated).
POSITION CALCULATION DELAY	4	uInt32	Time from reception of initial ping to start of position calculation.
ARRIVAL TIME COUNTS	4 * 1001	uInt32 array	An array of 1001 counters that track the number of pings that were received X msec after the initial ping, where the index in the array is X-1. For example, all pings that arrived within 1 msec of the initial ping will be at index 0, pings within 2 msec will be at index 1, etc. Index 1000 represents all pings that were received at least 1 full second later than the initial ping.

4.17 0x015A - NT Real Time Mapping V1

This data type is emitted periodically with information for mapping NT time to real time.

Field Name	Byte Length	Type	Description
NETWORK TIME PREVIOUS	8	uInt64	The Network Time as recorded approximately 1 second before this data item was transmitted.
REAL TIME PREVIOUS	8	uInt64	The real time, measured in microseconds, as recorded approximately 1 second before this data item was transmitted.
NETWORK TIME CURRENT	8	uInt64	The most recently recorded Network Time available at the time this data item was transmitted.
REAL TIME CURRENT	8	uInt64	The most recently recorded real time, measured in microseconds, available at the time this data item was transmitted.

4.18 0x0160 - Bootload Progress

This data type contains information on the progress of a bootload, including a rough percentage done.

Field Name	Byte Length	Type	Description
SERIAL NUMBER	4	uInt32	The serial number of the device being bootloaded.
LAST RECEIVED TOTAL PATH RSSI	1	uInt8	Signal strength of the last signal received.
LAST HEARD PACKET TIME	2	uInt16	The time that the last packet was heard in seconds.
FLAGS	2	array	An array of 25 bytes representing the sectors that have been received by the device.
MAX SECTORS PER FLAG	1	uInt8	The maximum number of sectors to be represented by a single bit in the flags attribute.
LAST MAX SECTOR FLAG	1	uInt8	The position of the last flag that represents the maximum number of sectors. All after will represent one less sector per flag.
PERCENTAGE	2	uInt16	Estimated percentage of sectors completed. Guaranteed to be less than or equal to the actual.

4.19 0x0161 - Anchor Position Status V4

This data type is used to report the status of an anchor that provided location data about the reporting device.

Field Name	Byte Length	Type	Description
TAG SERIAL NUMBER	4	uInt32	The serial number of the tag.
NETWORK TIME	8	uInt64	The Network Time of the position.
ANCHOR STATUS ARRAY	X	struct array	Variable length array of Anchor Status Structures. See Anchor Status Structure for details.

4.19.1 Anchor Status Structure

The ANCHOR STATUS ARRAY field in the Position's Anchor Status V4 data item is an array of these Anchor Status Structures.

Field Name	Byte Length	Type	Description
ANCHOR SERIAL NUMBER	4	uInt32	The serial number of the anchor.
ANCHOR INTERFACE IDENTIFIER	1	uInt8	The interface identifier of the anchor.
STATUS	1	uInt8	0 = Anchor data is good. 1 = Anchor is unknown. 2 = Anchor data does not match other anchors. 3 = Anchor data is inconsistent with previous data. 4 = Network time not synchronized. 5 = Anchor data is not good enough for tracking. 6 = Duplicate anchor data. 7 = Old data used to fill for a missed packed.
QUALITY	2	uInt16	A number from 0 to 10,000, with 0 being poor quality and 10,000 being high quality.

4.20 0x016A - Bounding Box Report

This data type is used to report the bounding box parameters.

Field Name	Byte Length	Type	Description
MIN X	4	uInt32	The minimum x-coordinate of the bounding zone in millimeters.
MIN Y	4	uInt32	The minimum y-coordinate of the bounding zone in millimeters.
MIN Z	4	uInt32	The minimum z-coordinate of the bounding zone in millimeters.
MAX X	4	uInt32	The maximum x-coordinate of the bounding zone in millimeters.
MAX Y	4	uInt32	The maximum y-coordinate of the bounding zone in millimeters.
MAX Z	4	uInt32	The maximum z-coordinate of the bounding zone in millimeters.

4.21 0x016B - Bounding Cylinder Report

This data type is used to report the bounding cylinder parameters.

Field Name	Byte Length	Type	Description
X	4	uInt32	The x-coordinate of the bottom center of the cylinder in millimeters.
Y	4	uInt32	The y-coordinate of the bottom center of the cylinder in millimeters.
Z	4	uInt32	The z-coordinate of the bottom center of the cylinder in millimeters.
RADIUS	4	uInt32	The radius of the cylinder in millimeters.
HEIGHT	4	uInt32	The height of the cylinder in millimeters.

4.22 0x0171 - Image Discovery V2

This data type contains information to inform the CUWB Network about the images the device is currently running. The CUWB network will use this information to determine if the device needs a firmware upgrade.

> This data item is only emitted on the anchor CDP stream or via CSP.

Field Name	Byte Length	Type	Description
VID	1	uInt8	Virtual Vendor ID for device images.
PID	1	uInt8	Virtual Product ID for device images.
RUNNING IMAGE TYPE	1	uInt8	Type of the current running image.
TLVS	X	TLV array	Variable length array of TLV (Type Length Value) entries. Every entry will be prefixed with one byte for Type and one byte for Length. See Image Discovery TLV for details.

4.22.1 Image Discovery TLV

The following are the types currently supported by the TLV data structure.

TLV Type	Type Name	Byte Length	Type	Description
1	SECTOR SIZE	2	uInt16	Notify the device of the sector size the application will provide. **512 byte default assumed if not present**
2	NO CHANGE ECHO	0	-	When set by a device in a Image Discovery V2 and the owning application of the device has no new image for the device, the application shall respond with an Image Notification V2 that is a copy of the Image Discovery V2. This allows the device to quickly determine there is nothing to be done and move onto the firmware it already has.
3	BOOTLOADING TIMEOUT	1	uInt8	Time in seconds the bootloader should wait for a new image if this image is loaded already. 255=indefinitely. The application (CUWB Engine, CIF Loader, etc) should derive this from the CIF file property 0x0804.
4	IMAGE INFORMATION V2	X	struct array	An array of Image Information V2 Structures identifying the images on the device. See Image Information V2 for details.

4.22.2 Image Information V2

This structure contains information identifying a device image.

Field Name	Byte Length	Type	Description
TYPE	1	uInt8	The type of image this data represents. 0 = Recover. 1 = Bootloader. 2 = Firmware. 3 = Almanac. 4 = Application.
VERSION	32	str	The version string of the image, null-terminated. If the string is less than the max (32B), it is padded with junk data.
SHA1	20	Byte Array	The IVSHA1 of the image with a maximum size of 20B.
LENGTH	4	uInt32	The number of bytes the image contains.
FLAGS	2	uInt16	Flags that can extend the meaning of this image information. Not currently used.
OPTIONS	Y	Byte Array	Variable length. Flags can extend the packet to have additional information.

4.23 0x8009 - Image Discovery V1

This data type contains information to inform the CUWB Network about the images the device is currently running. The CUWB network will use this information to determine if the device needs a firmware upgrade.

> This data item is only emitted on the anchor CDP stream or via CSP.

Field Name	Byte Length	Type	Description
MANUFACTURER	64	str	The manufacturer in a null-terminated string format. If the string is less than the max (64B), it is padded with junk data.
PRODUCT	32	str	The product type in a null-terminated string format. If the string is less than the max (32B), it is padded with junk data.
RUNNING IMAGE TYPE	1	uInt8	Type of the current running image. 0 = Recover. 1 = Bootloader. 2 = Firmware. 3 = Almanac. 4 = Application.
IMAGE INFORMATION	X	struct array	An array of Image Information Structures identifying the images on the device. See Image Information V1 for details.

4.23.1 Image Information V1

This structure contains information identifying a device image.

Field Name	Byte Length	Type	Description
TYPE	1	uInt8	The type of image this data represents. 0 = Recover. 1 = Bootloader. 2 = Firmware. 3 = Almanac. 4 = Application.
VERSION	32	str	The version string of the image, null-terminated. If the string is less than the max (32B), it is padded with junk data.
SHA1	20	str	The IVSHA1 of the image with a maximum size of 20B.

4.24 0x802F - Ping V5

This data type is emitted by an anchor when it receives a tag's UWB Beacon. The serial number in the CDP Packet header will be the serial number of the receiving anchor.

> This data item is only emitted on the anchor CDP stream.

Field Name	Byte Length	Type	Description
SOURCE SERIAL NUMBER	4	uInt32	The serial number of the tag that transmitted the UWB Beacon.
SEQUENCE	2	uInt16	The rolling sequence number of the Beacons emitted by the tag.
BEACON TYPE	1	uInt8	There are several Beacon types which effect various properties of the UWB Beacon, such as the UWB packet length. NOTE: This does not effect the length of the Ping.
RX NETWORK TIME QUALITY	1	uInt8	The quality of the Network Time Synchronization of the anchor at the time of the reception of this UWB Beacon.
RX UWB TIME	8	uInt64	The UWB Time at which the UWB Beacon was received at this anchor.
RX NETWORK TIME	8	uInt64	The Global Network Time at which the UWB Beacon was received at this anchor.
SIGNAL STRENGTH	12	struct	See Signal Strength for details.
INTERFACE IDENTIFIER	1	uInt8	Identifier of the interface on which this anchor received the UWB Beacon.
PAYLOAD	X	Byte Array	Variable Length. Additional data received in the UWB Beacon.

4.25 0x80B2 - Tick V5

This data type is emitted by an anchor when it transmits a Network Time Synchronization packet. The serial number in the CDP Packet header will be the serial number of the transmitting anchor.

> This data item is only emitted on the anchor CDP stream.

Field Name	Byte Length	Type	Description
NETWORK TIME	8	uInt64	The Global Network Time at which this Network Time Packet was transmitted.
UWB TIME	8	uInt64	The UWB Time at which this Network Time Packet was transmitted.
NETWORK TIME QUALITY	1	uInt8	The quality of the Network Time Synchronization of the anchor at the time of this transmission.
INTERFACE IDENTIFIER	1	uInt8	The identifier for the interface through which the device transmitted this Network Time Packet.
TX SEQUENCE	1	uInt8	Used to pair a tick V5 with a Timed RX V6

4.26 0x80B3 - Timed Reception V6

This data type is emitted by an anchor when it receives another anchor's Network Time Synchronization packet over UWB. The serial number in the CDP Packet header will be the serial number of the receiving anchor.

> This data item is only emitted on the anchor CDP stream.

Field Name	Byte Length	Type	Description
RX UWB TIME	8	uInt64	The UWB Time at which the UWB Packet was received.
RX NETWORK TIME	8	uInt64	The Global Network Time at which the UWB Packet was received.
SOURCE SERIAL NUMBER	4	uInt32	The serial number of the anchor that transmitted the UWB Packet.
SOURCE INTERFACE IDENTIFIER	1	uInt8	Identifier of the interface from which the transmitting anchor transmitted the UWB Packet.
SIGNAL STRENGTH	12	struct	See Signal Strength for details.
INTERFACE IDENTIFIER	1	uInt8	Identifier of the interface on which the receiving anchor received the UWB Packet.
RX NETWORK TIME QUALITY	1	uInt8	The quality of the Network Time Synchronization of the receiving anchor at the time of its reception.
RX PACKET TYPE	1	uInt8	The type of UWB Packet received.
TX SEQUENCE	1	uInt8	Used to pair Tick V5 with a Timed RX V6

5 Revision

Version	Date	Change Description
5.0.1	2025-10-31	Added compatibility warning, Corrected broken text links
5.0.0	2025-09-15	Initial Preliminary Release, Compatible with 300 series devices