



Kepware Technologies

U-CON Driver: Buffer Pointers and Test Conditions

March, 2013
Ref. 1.02

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1. Overview

This document intends to discuss the seven conditional commands that move the U-CON (User-Configurable) Driver's buffer pointer, and the situations in which they might be used.

1.1 Resources

It is recommended that the following resources be utilized when following along with the examples:

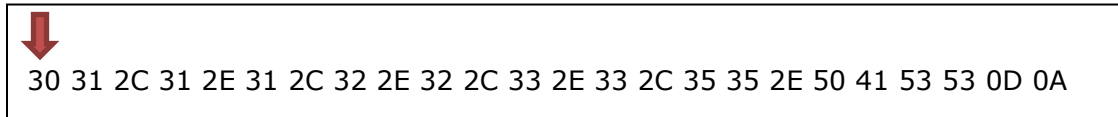
- KEPServerEX
- U-CON (User-Configurable) Driver. For more information, refer to [U-CON \(User-Configurable\) Driver Help](#).

2. Pointers on the Buffer Pointer

The U-CON Driver has Read Buffers, Write Buffers, Scratch Buffers, Global Buffers, and Rolling Buffers. Most profiles use Read and Write Buffers, with data generally at a fixed location. For example, the fourth byte of a Modbus Read response is the start of the data section. Every 2 bytes represent a single register. Users can specify the byte location when updating tags or when performing a conditional test: this is called an Absolute Byte Reference. Many devices that return data in variable length delimited strings, however. In order to work with these devices, users must be able to locate the start of the data.

2.1 The Buffer Pointer

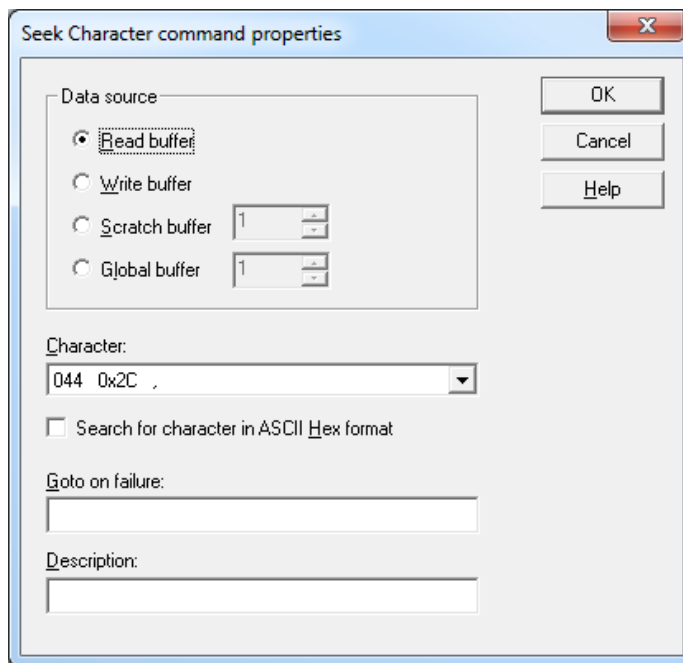
U-CON always starts with the buffer pointer at the first byte, which is Byte 1. In the image below, the string "01,1.1,2.2,3.3,55,PASS" is represented in ASCII (where 0 is 0x30). The "0x" will be left off in all examples.



The buffer commands that move the buffer pointer allow conditional and process commands to perform at that location as well, instead of at an Absolute Byte Reference.

2.2 Seek Character Command

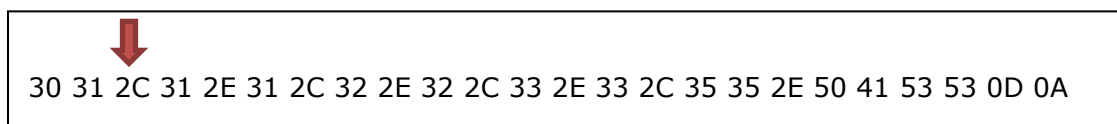
The Seek Character Command allows users to find a character's first occurrence in the selected buffer from the current buffer location. The buffer pointer will then be moved to that position.



Descriptions of the parameters are as follows:

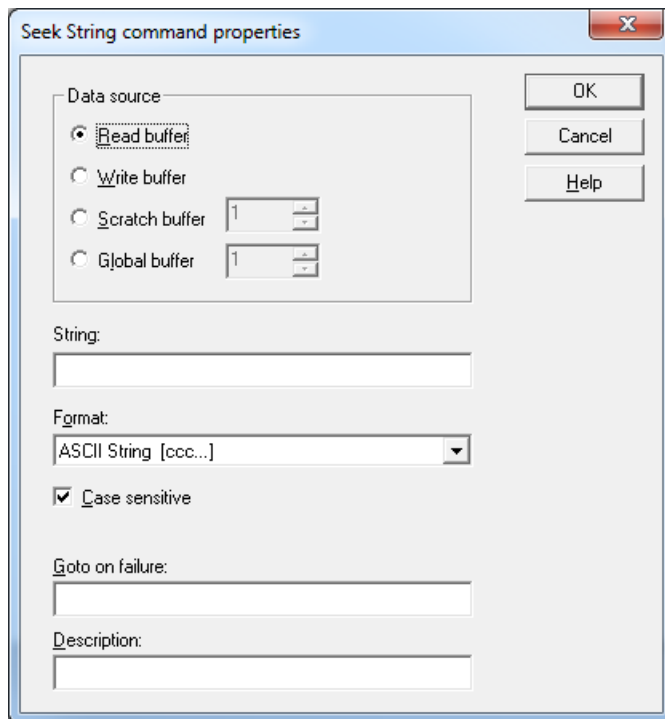
- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Character:** This parameter specifies the byte value and corresponding character. The valid range is 0 (0x00) to 255 (0xFF). In this example, the command is seeking a comma.
- **Search for character in ASCII Hex Format:** When checked, the character format will be ASCII Hex (0x32 0x43).
- **Description:** This field may be used to specify a process to go to if the Seek Character Command fails, thus allowing users to describe an exit or failure process.

For example, if using the previously defined response string, the buffer pointer would now be located at the first comma at Byte 3.



2.3 Seek String Command

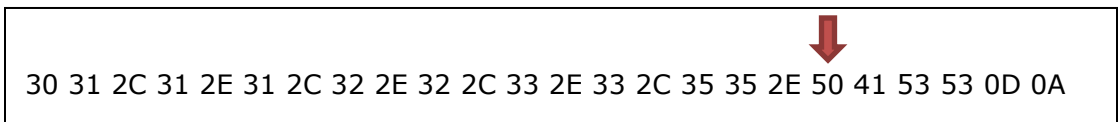
The Seek String Command is similar to the Seek Character Command, but allows users to search for a complete string instead of a single character. It is useful when working with a device that is designed to output data to an ASCII printer, rather than to a PC. The data may be preceded by a name on which users can search. If found, the buffer pointer will move to the first character in the string.



Descriptions of the parameters are as follows:

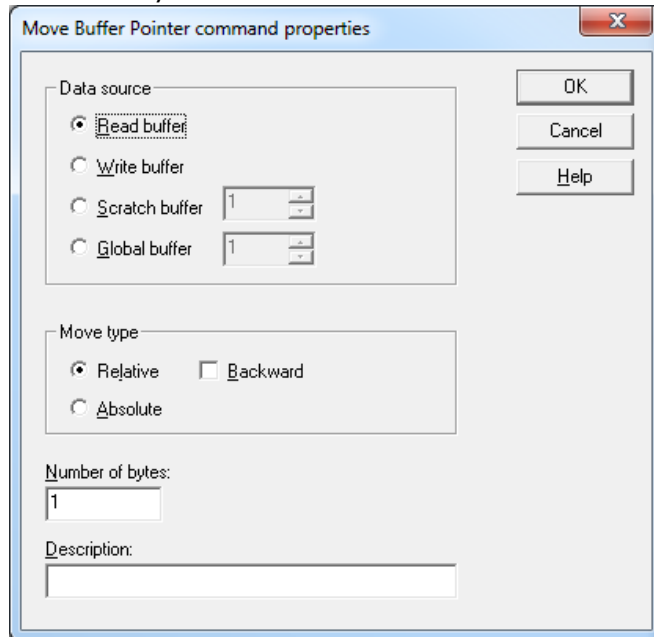
- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **String:** This field specifies the string for which to search.
- **Format:** This parameter specifies the string's format. Options include the Hex or ASCII formats that are supported by U-CON.
- **Case Sensitive:** When checked, the string for which to search will be case sensitive. The default setting is unchecked.
- **Description:** This field may be used to specify a process to go to if the seek fails, thus allowing users to describe an exit or failure process.

In this example, the Seek String Command may be done on the word "PASS". If the seek succeeds, the buffer pointer will be located at Byte 19.



2.4 Move Buffer Pointer Command

The Move Buffer Pointer Command allows users to move the buffer pointer forwards or backwards from its current location. It may also be moved to an Absolute Byte Position.

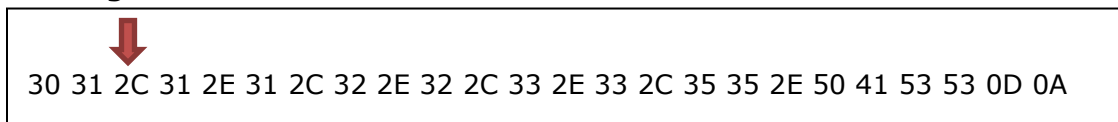


Descriptions of the parameters are as follows:

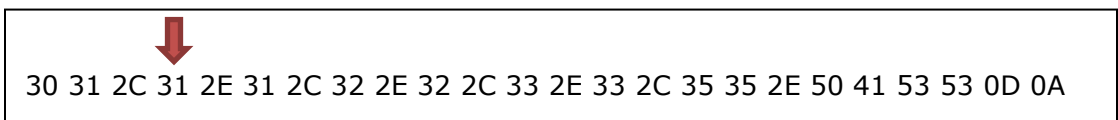
- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Move Type:** This parameter specifies the direction of movement. Options include Relative, Backward, and Absolute.
- **Number of Bytes:** For forward or backward movement the number of to move is specified.

In this example, a successful Seek Character Command placed the buffer pointer at Byte 3. Moving the buffer pointer by 1 byte positive will place the buffer pointer at Byte 4, which is the first byte of the next piece of data.

Seeking the Comma



Moving the Buffer Pointer by 1 Byte Positive



3. Using Conditional Commands

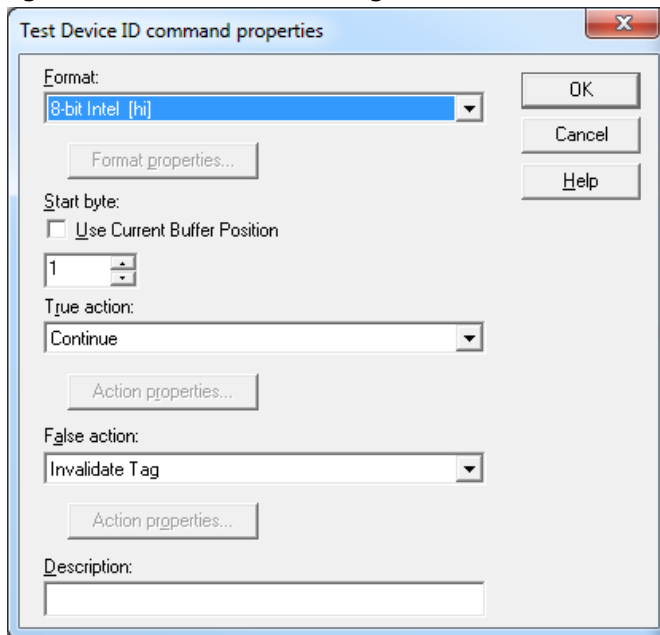
Conditional Commands provide users a way to test the packets coming from a device in order to validate the response. This procedure is demonstrated in Kepware's "U-CON: Error Handling in Transactions" document. The commands can also be used to perform actions based on specific condition results (as demonstrated in Kepware's "U-CON: Outputting Specific Strings Based on Received Value").

Conditional Commands test check sums, Device IDs, strings, characters, and so forth. Tests will return a true or false result. Users can select one of the following actions based on the test result:

- **Clear RX Buffer:** This clears the contents of the received buffer.
- **Continue:** This continues to the next transaction.
- **End:** This ends the transaction step of the response.
- **Go To:** This is a specific label in the transaction steps to process a set of steps.
- **Invalidate Tag:** This sets the tag or block of tags supported in the current transaction invalid (bad quality) for 1 poll cycle.
- **Log Event:** This posts an event message to the server's Event Log.

3.1 Test Device ID Command

The Test Device ID Command allows users to test the Device ID in the packet against the Device ID configured in the server's Device Properties.



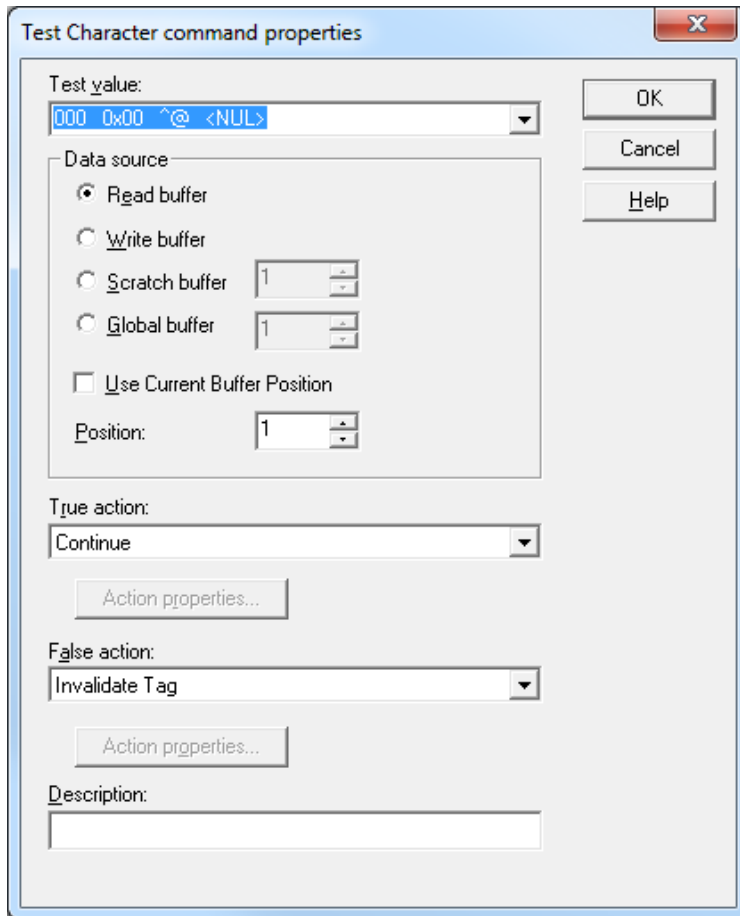
Descriptions of the parameters are as follows:

- **Format:** This parameter specifies the Device ID's format.
- **Start Byte:** This parameter specifies the starting byte location for the Device ID in the Read Buffer.

3.2 Test Character Command

The Test Character Command allows users to test a character in the specified buffer.

Note: For more information, refer to Kepware’s “U-CON: Handling Errors in Transactions” document.

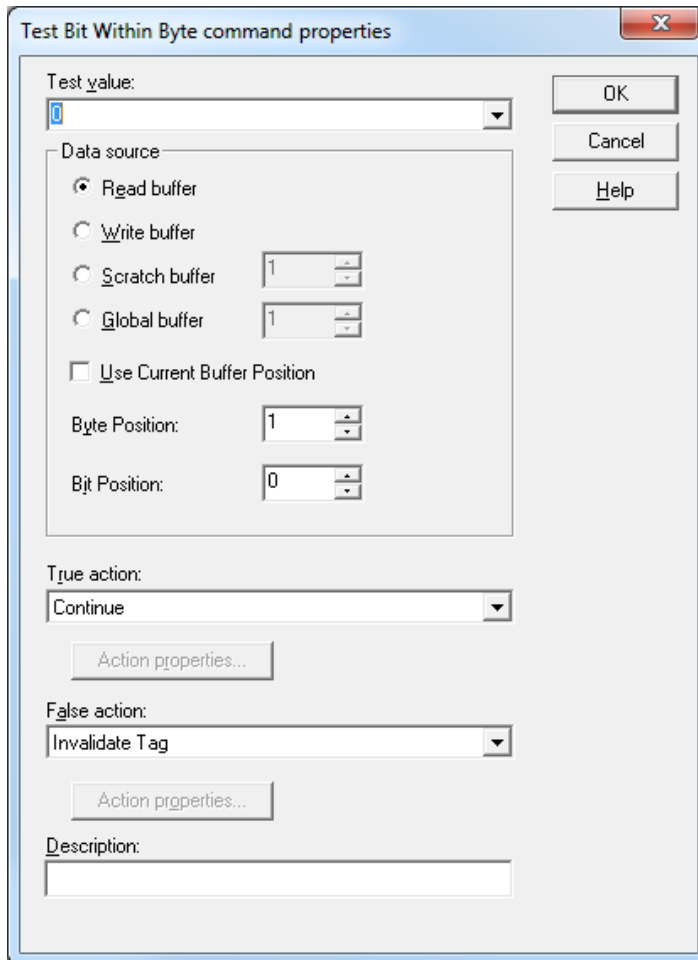


Descriptions of the parameters are as follows:

- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Position:** This parameter specifies the starting byte location for the character in the buffer.

3.3 Test Bit Within Byte Command

The Test Bit Within Byte Command allows users to test a specific bit within a specific byte. Some devices send status bytes or may even combine a data value and status in the same bit. For example, a weight scale could use the Most Significant Bit (MSB) to indicate a stable value.



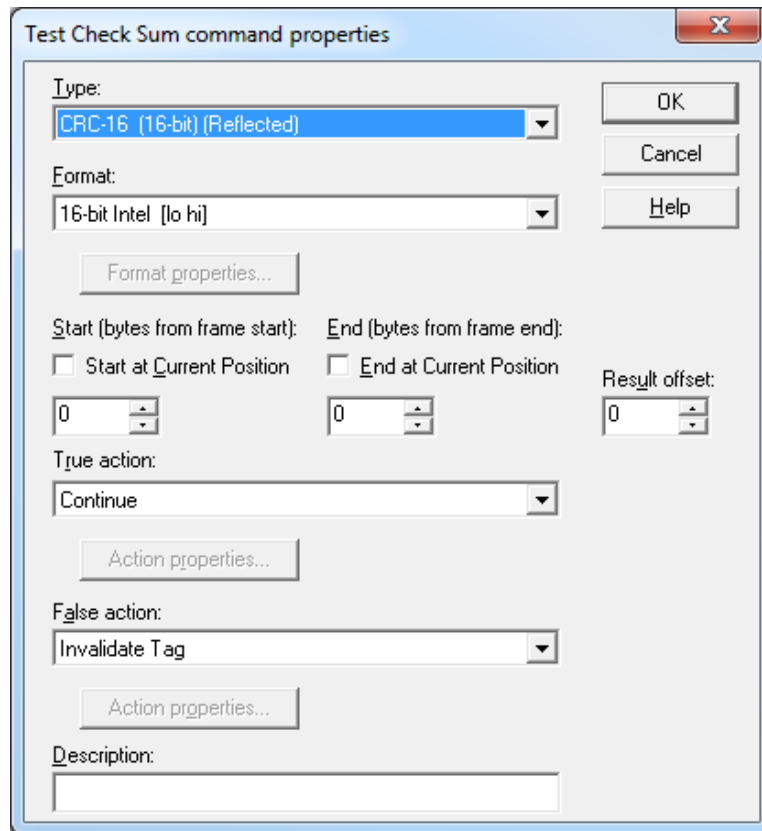
Descriptions of the parameters are as follows:

- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Byte Position:** This parameter specifies the location of the byte in the buffer.
- **Bit Position:** This parameter specifies the bit that will be tested within the byte.

3.4 Test Check Sum Command

The Test Check Sum Command allows users to test the check sum sent by the device in the packet. The check sum is used to ensure data integrity.

Note: For more information, refer to Kepware’s “U-CON: Handling Errors in Transactions.”



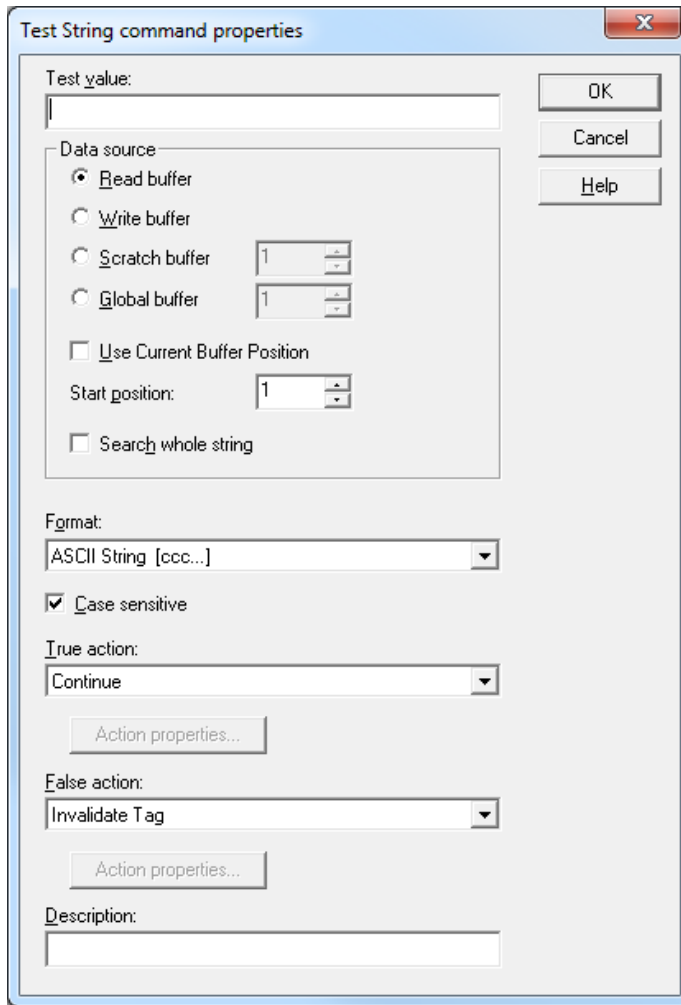
Descriptions of the parameters are as follows:

- **Start (bytes from frame start):** This parameter specifies the start location of the region that is used to calculate the check sum.
- **End (bytes from frame end):** This parameter specifies the end location of the region that is used to calculate the check sum.
- **Result Offset:** This parameter specifies the location of the check sum in relation to the end of the checked region.

Note: The data source is the Read Buffer.

3.5 Test String Command

The Test String Command allows users to test for a string in the specified buffer. It can be used to verify that a specific packet has arrived.

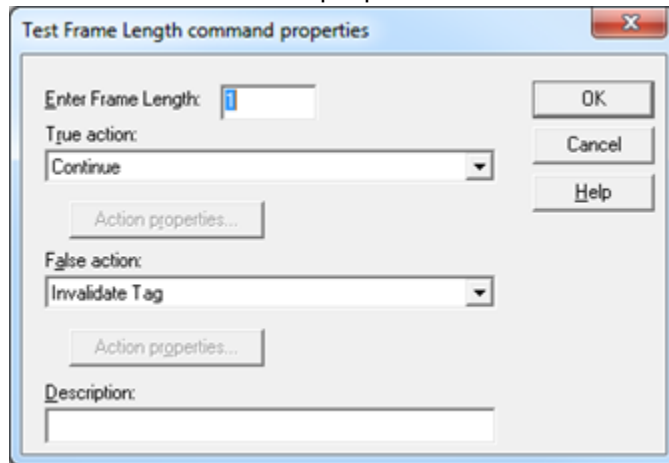


Descriptions of the parameters are as follows:

- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Start Position:** This parameter specifies the starting byte location of the string in the buffer.
- **Search Whole String:** When checked, this option will test the entire buffer for the string.
- **Format:** This parameter specifies the string format.

3.6 Test Frame Length Command

The Test Frame Length Command allows users to test the received data packet to ensure that it is the proper size.

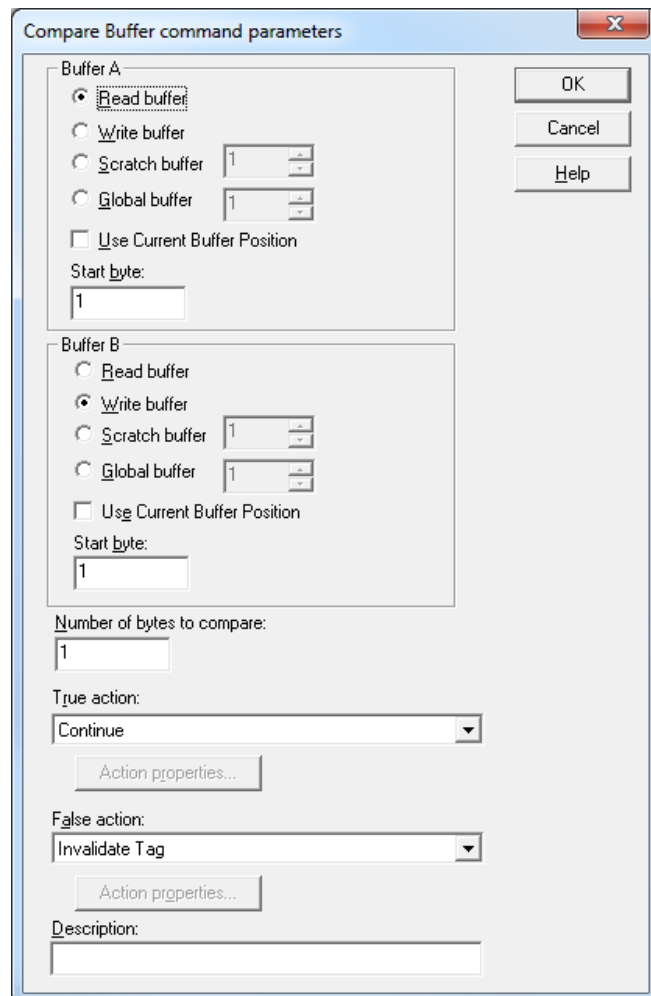


Description of the parameter is as follows:

- **Enter Frame Length:** This parameter specifies the length of the packet to test.

3.7 Compare Buffer Command

The Compare Buffer Command compares one buffer to another.



Descriptions of the parameters are as follows:

- **Data Source:** This parameter specifies the type of buffer that will be used as the data source. Options include Read Buffer, Write Buffer, Scratch Buffer, and Global Buffer.
- **Start Byte:** This parameter specifies the starting byte location for comparison in each buffer.
- **Number of Bytes to Compare:** This parameter specifies the number of bytes for comparison.

4. Summary

At this point, users should have a better understanding of both how buffer pointers work and the conditional commands that are available in the U-CON Driver.