Introduction

Many systems allow integration over a Serial Data protocol, e.g. RS232 or RS485. These Serial Protocols pass data one character at a time from one device to the other. Most Pharos controllers have the ability to communicate over a serial protocol, LPCs and RIO IOs can communicate using either RS232 or RS485, and LPC Xs and TPC+EXTs can communicate using RS232.

Physical Connections

Pharos Controllers have one of two connectors available for Serial communications. The LPC X and older LPCs have a 9 pin D-Sub (DE-9) female connector, while newer LPCs, EXTs and RIO IOs feature a 3 pin terminal connector.

Communications

Serial communications with Pharos Systems don't have a standard communications syntax, but typically the other device involved will have a standard syntax, so the Pharos controller should be configured to match that syntax.

The way Serial communication is configured allows you to enter any ASCII, Hex or Decimal strings for the controller to listen for, or to output to other devices.

All serial communications with a Pharos System are handled within the Trigger functionality.

Serial Input

A Serial Input trigger is included to allow you to receive data into the Pharos controller.

To configure the Trigger, add the string that you want to listen for (e.g. start_timeline_1)

Serial Output

An Output Serial Action is available which will output a serial message whenever the associated trigegr is fired.

To configure the Action, enter the string that you want to output (e.g. timeline_1_started)
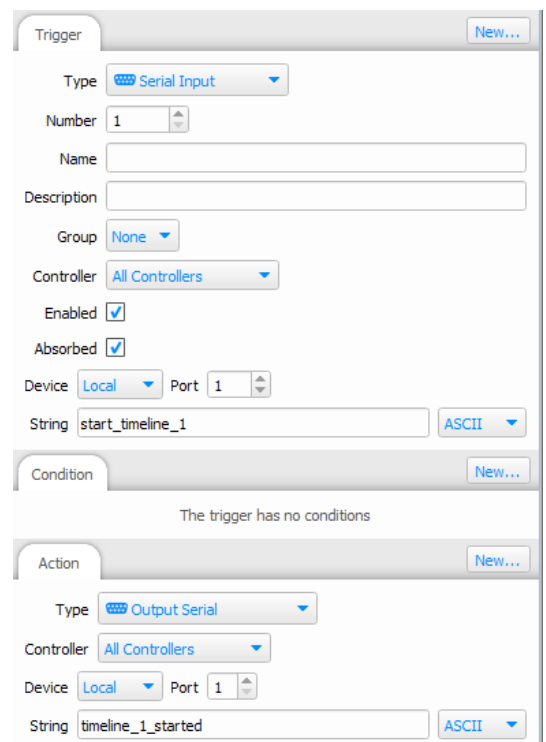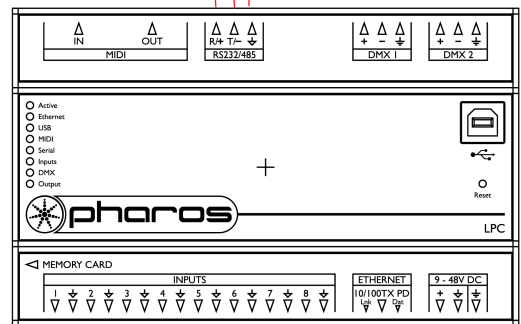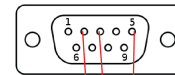
String Matching

Using a single trigger for each message that you want to receive can make it easier to see what is happening within the project, but can lead to some unexpected behaviour due to the string matching process.

Whenever the Pharos System receives a character (letter, number, punctuation or control character) on the serial connection, it is stored in a buffer. If the characters in the buffer match the string in any of the Serial Input triggers in your project, the trigger will be fired and the buffer cleared.

Example:

If you have a series of triggers to start different timelines, you could have a trigger with the string start_timeline_1 and

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another trigger with the string start_timeline_11.
If this happens, then whenever the controller receives the string start_timeline_11 it is read in as follows:

<code>s t a r t _ t i m e l i n e _ 1</code> 1

The red characters are the same as the trigger configured to receive start_timeline_1 and so that trigger will be fired and the buffer cleared, then the second 1 will be received.

There are two ways around this:
1. Add leading zeroes to the strings:
  start_timeline_01
  start_timeline_11
2. Add a terminating character after the number, typically a newline or carriage return character
  start_timeline_1\r (\r is the ASCII representation of a carriage return character)
  start_timeline_11\r
 This will force the trigger to wait for the character after the number before firing, ensuring that the whole number is received.

Variable Data

Serial Input

If you have a large number of timelines that you want to start using a serial message, or you want to be able to pass in colour information for example, then having individual triggers for every possible value will become unwieldy quickly. To get around this, you can capture bits of data from the string e.g. start_timeline_<2d>

The angle brackets (<>) define the capture region and the data inside the angle brackets determines what sort of data is expected.
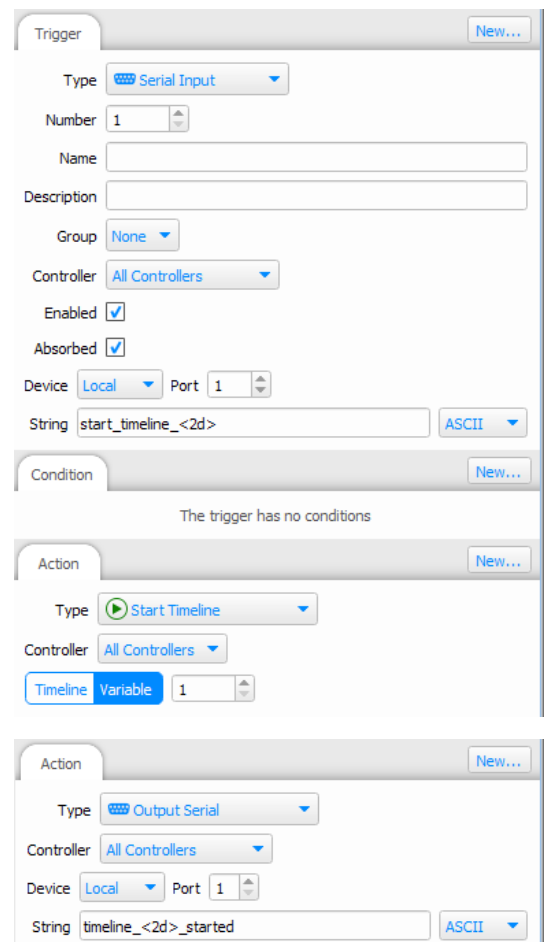
In the example above <2d> will capture any two digit number (00-99), meaning that the trigger will be fired whenever a string containing "start_timeline_" followed by a two digit number.

The two digit number is then captured into a variable, which can then be used in the action associated with the trigger (e.g. Start Timeline).

Serial Output

A serial output action can also use variables to output a variable piece of data.

If we wanted to reply to the external device to say that we have started the timeline that was requested, we can form a serial output string including a capture in the same format as the input and the number will be passed from the Trigger to the Action and the number will be sent back to the external device.

Further information

Further information can be found in the Triggers section of the software help or by contacting Pharos Support.

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