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INDUSTRIAL CONTROL COMMUNICATIONS, INC.

TCS Basys Master Driver Manual

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1 Basys Master

1.1 Overview

This driver supports the TCS Basys master protocol. Some notes of interest are:

- Supports access to all parameter types and extensions.
- Requests are fully configurable through service objects.
- Holiday Scheduling parameter position encoding is fully supported.
- The driver supports extended commands for TCS and non-TCS devices.
- Flexible data scaling through the use of a multiplier and offset allows data to be freely scaled to any range.

1.2 Master Settings

Baud Rate
Select the desired network baud rate.

Parity
Fixed at No Parity (1 Stop Bit).

Timeout
Sets the time in milliseconds that the driver will wait for a response from a device after sending a request.

Scan Rate
This is the time in milliseconds the driver will wait between sending requests. This is a useful feature for certain devices or infrastructure components (such as radio modems) that may not be capable of sustaining the maximum packet rates that the driver is capable of producing. The start time for this delay is taken with respect to the moment at which the driver is capable of sending the next packet (due to either reception or timeout of the previous request). If no additional time is required, setting this field to 0 instructs the driver to send its next request packet as soon as possible.

1.3 Service Object Settings

The TCS Basys master driver uses service objects to define the parameter values to read from or write to the slaves. Each parameter in a service object is mapped to 2 bytes in the internal database (the data size is fixed at 16-bit, as this is the native data size of TCS Basys parameters).

Description
This 32-character (max) field is strictly for user reference: it is not used at any time by the driver.

Destination Address

Indicates the destination address (0…255) of the device on the network that will be accessed by this service object.

Start Position

Defines the starting position number (0…15) for a range of positions associated with this service object.

Number of Positions

Defines the number of positions (1…16) associated with this service object.

Database Address

Defines the database address where the first parameter of this service object will be mapped. The configuration studio will not allow entry of a starting database address that will cause the service object to run past the end of the database. The highest valid database address, therefore, depends on the number of parameters to be accessed.

Data Type

Fixed at 16-Bit Signed.

Multiplier

The amount that data values are scaled by when creating network values or database values. The multiplier works in conjunction with the "Offset" field according to the details provided in section 1.6.

Offset

The amount that is added to or subtracted from data values when creating network values or database values. The offset works in conjunction with the "Multiplier" field according to the details provided in section 1.6.

Parameter

Select the appropriate parameter read/write command codes ("A/a"…"Z/z") for this service object. An optional "Command Extension" modifier may also be chosen. Refer to the appropriate TCS Basys documentation to determine the commands that are supported for a specific device.

Command Extension

If applicable, select the appropriate command extension for the targeted slave device. If no command extension is desired, select "Normal Command".

Read Command

Check this box to enable reading: the service object will continuously read from the device unless a pending write exists.

Write Command

Check this box to enable writing: when values encompassed by this service object change in the internal database, these changes will be written down to the targeted device.

Note that parameter commands "K", "L", and "M" target read-only monitoring parameters: the "Write Command" checkbox must be disabled when these commands are selected.

1.4   Diagnostics Object

Each service object can optionally include a diagnostics object for debugging and diagnostics.

Diagnostics Database Address
Enter the database address at which to store the diagnostics information.

1.5   Holiday Scheduling Parameters

The positions for parameter "H" are encoded differently than other parameters. With respect to month, date, and days for both holiday sets (positions 0…5), the four-byte position is divided into the upper two bytes and lower two bytes. The upper two bytes provide the holiday index (1…12), while the lower two bytes provide the position value. Also note that this command does not support reading multiple positions.

1.6   Parameter Scaling

Parameter values can be scaled using the available "Multiplier" and "Offset". Appropriate multiplier and offset values can be calculated given the raw data value range and the desired range via Equation 1 and Equation 2. In these equations, "Max" and "Min" are the raw data values, and "SMax" and "SMin" are the desired values.

$$multiplier = \frac{Max - Min}{SMax - SMin}$$ **Equation 1**

$$offset = SMin$$ **Equation 2**

Using these values for the multiplier and offset then allows us to calculate the database value and network value of each parameter associated with a service object via Equation 3 and Equation 4.

$$database\ value = \frac{network\ value}{multiplier} + offset$$ **Equation 3**

$$network\ value = (database\ value - offset) \times multiplier$$ **Equation 4**

As an example, let's assume that a given parameter has a raw value range of 0…255 and an actual range of 40…90. In order to scale the 0…255 raw value range to 40…90, follow Equation 1 and Equation 2. This results in a multiplier of 5.1 and an offset of 40. Further, if we wish to retain the resolution of the actual value down to 0.1 (tenths) units, then the calculated multiplier should be divided by 10 and the offset should be multiplied by 10 to give new values of 0.51 and

400 for the multiplier and offset, respectively. Using these values for the multiplier and offset will accomplish the goal of scaling the parameter data while simultaneously retaining the desired resolution.

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