Red Lion Instrument via MODBUS

Application Note

This document describes how to configure a Paradigm operator interface terminal to allow communications with a Red Lion instrument via MODBUS protocol. The communications protocol allows the HMI to access coils, inputs, and holding registers. Please read this document carefully before attempting to configure communications.

Introduction

The EDICT-97 configuration software has been designed to allow the user to enter a MODBUS address in a manner that should be familiar to the user. The driver allows the exchange of data with the device.

Accessing Data

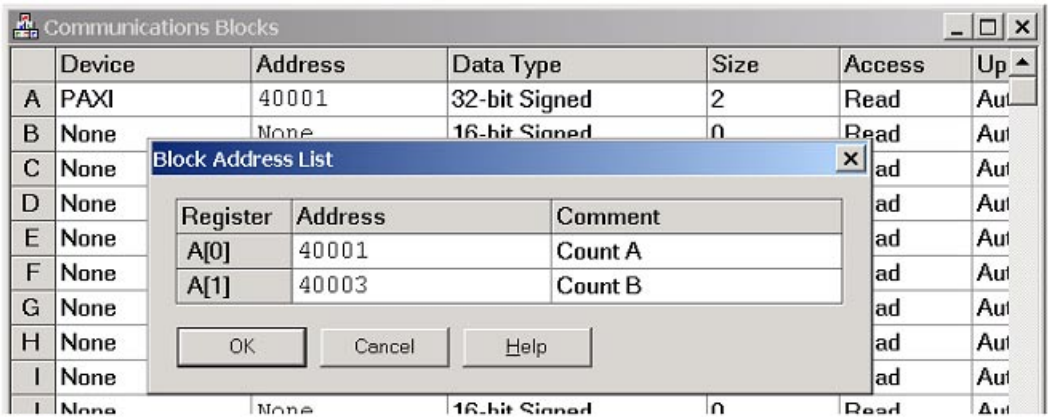
The MODBUS communications protocol allows access to a number of parameters over a serial communications link. The driver described here supports the parameters in the table below.

Prefix	Parameter	Data Type	Range	MODBUS Function Codes	Access
0	Digital Coils	BIT	00001 ~ 09999	01, 05, 15	Read/Write
1	Digital Inputs	BIT	10001 ~ 19999	02	Read
3	Analog Inputs	16-Bit INT	30001 ~ 39999	04	Read
4	Holding Registers	16-Bit INT	40001 ~ 49999	03, 06, 16	Read/Write

32-Bit Data

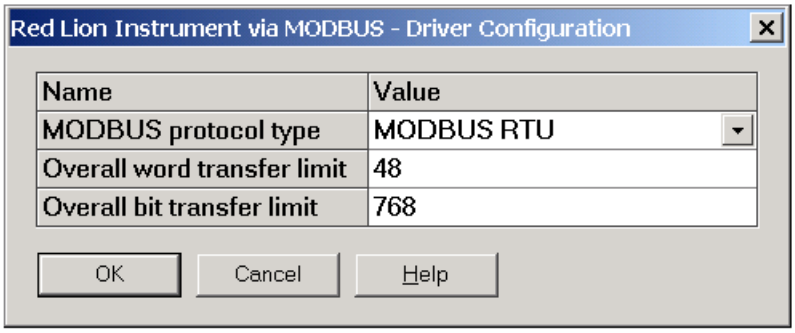
For 32-bit data that is stored in two contiguous holding registers, change the comms block data type to 32-bit, and select the lower MODBUS register. For example, to access two 32-bit values, Count A and Count B, that are stored in the following registers, configure the comms block as shown.

MODBUS Register	Description
40001	Count A, high-order half of the value
40002	Count A, low-order half of the value
40003	Count B, high-order half of the value
40004	Count B, low-order half of the value



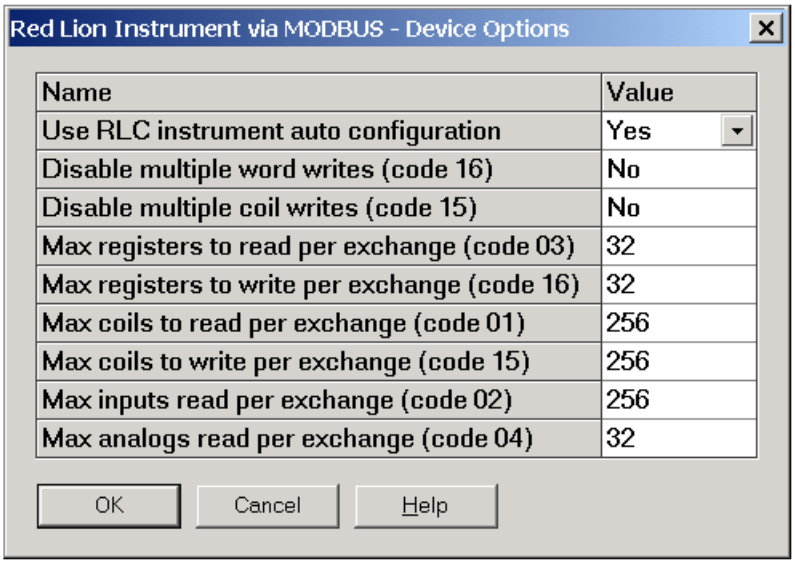
Driver Configuration

The driver configuration dialog is used to select the desired protocol, MODBUS RTU or MODBUS ASCII; and the overall transfer limits. The default values are shown.



Device Options

The device options dialog is used to select the communications behavior of each device. The default values are shown.



Use RLC instrument auto configuration. When selected Yes, the driver will poll the Red Lion Controls instrument, using MODBUS function code 17, and will set all of the maximum reads and writes per exchange accordingly. All other settings in this dialog are then ignored.

Disable multiple word writes (code 16). When selected Yes, all word writes are done individually, using MODBUS function code 06; system performance may be reduced.

Disable multiple coil writes (code 15). When selected Yes, all coil writes are done individually, using MODBUS function code 05; system performance may be reduced.

Max reads and writes per exchange. These values limit the maximum amount of data transferred per exchange. For best performance, set these values to the maximum allowed by the destination device. Note: communication errors will occur if these values are set larger than the destination device's maximums.

Knowledge of Unit Operation Is Assumed

In all cases, the simple principle of 'pass-through' is maintained: there is no attempt to validate an address in terms of the end use of the unit: both familiarity with the Red Lion device and knowledge of system operation are assumed.

Communications

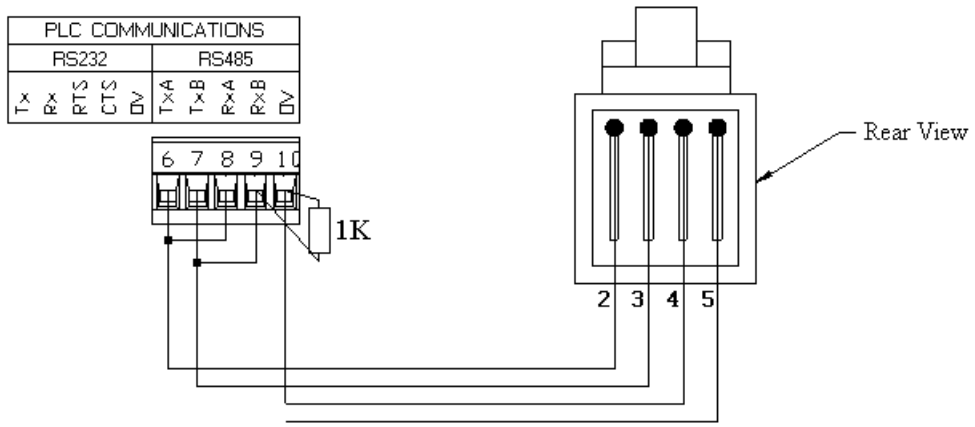
Communications with the Red Lion Instrument MODBUS master device is via RS-485. Default serial communications format is RS485, 9600 baud rate, 8 data bits, No parity, and 1 stop bit. The default Device Address is 1. Typical connection details are described in the tables below.

DLC, IAMS, ITMS Connections

Paradigm RS485 Port	DLC, IAMS, ITMS RJ-11 Port
Pin 6 (TxA) & Pin 8 (RxA)	Pin 2 (B-)
Pin 7 (TxB) & Pin 9 (RxB)	Pin 3 (A+)
Pin 10 (Comm.)	Pin 4 (Comm.)

In addition a 1k8 resistor must be fitted between Pin 9 (RxB) and Pin 10 (Comm.) on the Paradigm.

Cable Part Number #P893805Z, 2M long:



PAX MODBUS Connections

Paradigm RS485 Port	PAX MODBUS Option Card
Pin 6 (TxA) & Pin 8 (RxA)	Pin 12 (B-)
Pin 7 (TxB) & Pin 9 (RxB)	Pin 13 (A+)
Pin 10 (Comm.)	Pin 14 (Comm.)

In addition a 1k8 resistor must be fitted between Pin 9 (RxB) and Pin 10 (Comm.) on the Paradigm.