

Modbus Protocol Emulation Program

The Modbus Protocol Emulation Program is designed to allow a ROC300-Series Remote Operations Controller with a ROCPAC or FlashPAC, or a FloBoss™ 407 Flow Manager to emulate the Modbus protocol. This makes it possible to integrate the ROC or FloBoss into a Modbus host/slave system.

The Modbus program is loaded and configured with ROCLINK™ Configuration Software or ROCLINK for Windows Configuration Software. The program can be configured to emulate several Modbus protocol variations. In addition to acting as a Modbus slave, the ROC can function as a Modbus host (master) with the ability to poll Modbus slave devices. A port with Modbus Master enabled may still act as a Slave device. Either the ASCII or the RTU mode of transmission can be used.

Modbus Compatibility

The ROC supports the Modbus function codes shown in Table 1. These codes use the command and response formats listed in the *Modbus Protocol Reference Guide* (January 1985), form PI-MBUS-300. Point types and parameters for the supported Modbus function codes are selected using the ROCLINK Configuration Software. Any point type and parameter can be selected for codes 3, 4, 6, and 16. Codes 1, 2, 5, and 15 are restricted to status inputs

and outputs. The length of data returned or transmitted depends upon the parameter selected.

Data Link

The data link between the Modbus device and the ROC can be any of the communications types supported through the selected ROC port:

- ◆ EIA-232 (RS-232) for asynchronous serial communications, with either RTS or RTS/CTS handshaking.
- ◆ EIA-422/EIA-485 (RS-422/RS-485) for asynchronous communications.
- ◆ Radio modem for communications to a radio.
- ◆ Leased line modem for communications over customer-owned or leased lines.
- ◆ Dial-up modem for communications over a telephone network.

Modbus Host Mode

The Modbus Host Mode of operation allows the ROC to poll Modbus devices (including other ROCs that have the Modbus program), receive data, and store the data in the ROC.

Table 1. Supported Modbus Function Codes

Code	Meaning	Action
01	Read Coil Status	Obtain current status (ON/OFF) of a group of logic coils.
02	Read Input Status	Obtain current status (ON/OFF) of a group of discrete inputs.
03	Read Output Registers	Obtain current binary value in one or more holding registers.
04	Read Input Registers	Obtain current binary value in one or more input registers.
05	Force Single Coil	Force logic coil to a state of ON or OFF.
06	Preset Single Register	Place a specific binary value into a holding register.
15	Force Multiple Coils	Force a series of consecutive logic coils to defined ON or OFF states.
16	Preset Multiple Registers	Place specific binary values into a series of consecutive holding registers.

The data can be used for parameter updates, FST program registers, and other variables. This allows a user-written program to control the polling performed by the ROC. The ROC host can also send commands to set outputs and to write data to a slave device.

Data Transmission Modes

Two modes of data transmission are available for use in a Modbus system: ASCII (American Standard Code for Information Interchange) and RTU (Remote Terminal Unit). Both modes provide the same capabilities for communicating with the Modbus host and are selected depending on the equipment used. All devices in the communication network must be configured with the same mode of transmission.

In RTU mode, data is sent in 8-bit binary characters. In ASCII mode, each 8-bit character is split into two hexadecimal numbers, which are then converted into ASCII printable characters.

Modbus Configuration

After the Modbus Protocol program is selected for a ROC communications port (typically COM1 or COM2) and loaded into the ROC, it can be configured. The Modbus functionality is configured for the selected port using up to four displays, which are accessed from the Data Types menu (see Figure 1).

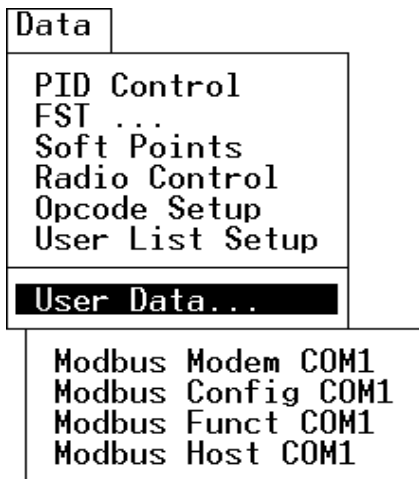


Figure 1. ROCLINK for DOS User Data Menu for Modbus

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ROC Point Types

Parameters in all the standard ROC point types are accessible through the Modbus protocol. These point types are listed in the following table.

Type	Description
0	Configurable Opcode
1	Discrete Inputs
2	Discrete Outputs
3	Analog Inputs
4	Analog Outputs
5	Pulse Inputs
6	PID Control
7	AGA Flow Parameters
9	Local Display Panel ^{1,2}
10	AGA Flow Values
11	Tank Parameters ¹
12	ROC Clock
13	System Flags
14	Communications Ports
15	System Variables
16	FST Registers
17	Soft Points
18	AI Calibration ¹
19	Database Setup
20	ROC Tasks
22, 23	User-defined
25-39	User-defined
40	MVS Parameters ^{2,3}
41	AGA Run Parameters ^{2,3}
42	Extra AGA Run Parameters ^{2,3}
43	User Lists ³
44	Power Control ³
56	AI Calibration ^{2,3}
57	Keypad/Log-on Parameters ^{2,3}

¹ROC300-Series with ROCPAC.

²ROC300-Series with FlashPAC.

³FloBoss 407.

Media

The Modbus program and user manual are supplied on a CD-ROM.