Create serial communications protocols to communicate with standard serial devices

Allows program debugging in a single PLC before the actual system has been assembled. Reduces the total lead time required for machine/equipment development and startup.

Key Features

The CX-Protocol software creates data communications procedures (protocol macros) to exchange data between standard serial devices and the PLC (Serial Communications Unit or Board).

What is a Protocol Macro?

A protocol macro defines the communications protocol for communications between the PLC and any serial device that has an RS-232C port or RS-422A/RS-485 port and uses half-duplex or full-duplex communications with start-stop synchronization. Serial communications can be processed without a ladder program routine once the protocol macro has been written to the Serial Communications Unit or Board (CS/CJ Series Unit/Board, C200HX/C200HG/C200HE Board, or CQM1H Board) and the PMCR instruction has been executed from the CPU Unit’s ladder program.

Overview of Protocol Macros

The protocol macro function can be broadly divided into the following two functions.

1. Creation of communications frames (messages)

2. Creation of procedures to send/receive those communications frames (messages)

1. Creating communications frames (messages)

1) Communications frames (referred to as ‘messages’ here), which can be understood by general-purpose external devices, can be created according to the communications specifications.

Note: In general, the data area of a send message contains command code and data. The data area of a receive message contains a response code.

2) Variables for reading data from (or writing data to, if receiving) the I/O memory data areas in the CPU Unit, can be created according to the communications specifications.

This function has the following advantages:

- Ladder program processing will not be necessary at all the CPU Unit when, for example, sending messages after arranging them all in data memory.
- The components of the previously created messages are stored in memory at the Unit or Board, not the CPU Unit. When sending/receiving data, the CPU Unit only has to execute the PMCR instruction.
- When handling one part of the I/O memory data, if the variable required for reading that data has been integrated into a send message, the Unit or Board will automatically read the required data from the I/O memory of the CPU Unit when the PMSU sends the message. Similarly, when writing data from one part of a received message into I/O memory, if the variable required to read the data has been integrated into the reception settings message, the Unit or Board will automatically write the data at the designated position in the message into I/O memory when the Unit or Board receives the message.

2. Creating procedures to send/receive the communications frames (messages)

1) This function enables all the processing needed to send or receive a message to be handled as one step, and possesses all the commands (step commands), such as Send, Receive, Send&Receive and Wait, that are needed for each step.

2) This step can be set so that the next process (step/next) depends on the processing result of the previous step. In particular, it is possible to set the sequence so that the next process depends on the contents of one or several set received messages.

Note 1: A send message created with a protocol macro will perform settings for messages that are actually sent.

Note 2: A receive message created with protocol macro will set an expected message for comparison with messages that are actually received.
CS1 Unit Descriptions

Developing Communication Protocols

Supports a Wide Range of Communication Protocols

- Send frames and receive frames can be created according to the communications frame (message) specifications of external devices. In addition, variables for exchanging data with the PLC can be incorporated in send and receive frames.
- Supports error check code calculation, frame length calculation during transmission processes, and numeric data conversion between ASCII and hexadecimal.
- Repeat variables can be used, 1:N communications are supported, and write destinations can be switched.
- Supports send and receive time monitoring functions as well as retry processing, so the required communications error processing can be specified easily.
- The interrupt function can send an interrupt to the CPU Unit when receiving data, so high-speed data processing can be performed. Expected reception data can be registered and processing can be switched based on the received data.

Complete Set of Debugging Functions

Sequences can be evaluated, saved, and printed with send/receive message tracing.

- Trace function: With a CS/CJ Series PLC, up to 1,700 characters of time-sequential transmission or reception data, which the Board or Unit exchanges with external devices, can be traced. Tracing allows the user to determine which messages were transmitted or received in each step number. The results of tracing can be saved as data in project files or printed.

- I/O memory monitor function: Send/receive data stored in the PLC’s data areas can be monitored.

Standard System Protocols

Protocols to exchange Data with OMRON Control Devices area

Data exchange protocols for 13 kinds of OMRON control devices, such as Temperature Controllers and Bar Code Readers, are provided. The standard system protocols can be copied easily and customized.

Specifications

Basic Functions
Create protocols, transfer protocols between the CX-Protocol and the Serial Communications Unit/Board, and save files.

Other Functions
Transmission line trace, standard system protocols, PLC I/O memory monitor, PLC error display, protocol print

Created Files
CX-Protocol project file (*.psw)

Operating Environment
CPU: Pentium 90 MHz or faster CPU
Note: Windows Me requires a 150 MHz or faster CPU. Recommended CPU: Pentium 166 MHz or faster
OS: Windows 95, 98, Me, 2000, NT 4.0, or XP

Compatible PLCs:
CS Series, CJ Series, CQM1H Series, and C200HX/HG/HE Series

Compatible Serial Communications Units/Boards:
CS Series: Serial Communications Units/Boards CS1W-SCLB2-V1, CS1W-SCLB3-V1, CS1W-SCLU1-V1
CJ Series: Serial Communications Units CJ1W-SCLU1 and CJ1W-SCLU1-V1
C200HX/HG/HE Communications Boards C200HW-COM02, C200HW-COM04-V1, C200HW-COM05, C200HW-COM05-V1, C200HW-COM60, and C200HW-COM60-V1
CQM1H: Serial Communications Board CQM1H-SCLB41