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[Title] MELSEC Communication Support S	Software Tool [Date of Issue] Oct. '98
[Relevant Models] SWnD5F-CSKP-E MELSEC-A Series MELSEC-QnA Series	Basic Communication Support Tool Ethernet Interface Module, Computer Link Module Ethernet Interface Module, Serial Communications Module

Thank you for your continued patronage of the Mitsubishi general-purpose programmable logic controller MELSEC-A/QnA Series.

By using the Mitsubishi communication support software tool for supporting communication between the MELSEC-A Series and QnA Series Programmable Logic Controller (hereinafter PLC) and personal computer, the communication program on the personal computer side connected with Ethernet or a computer link, etc., can be simplified.

The following sections describe the outline functions and data link functions of the basic communication support tool (SWnD5F-CSKP-E, hereinafter CSKP-E). The programming methods on personal computer side for reading/writing data to the MELSEC PLC CPU using CSKP-E are also described.

* For details on the CSKP-E, refer to the New Product News (No. 95E) and CSKP-E manual (manual No. is given in New Product News).

Whereas

[Details]

- 1. Outline of basic communication support tool (CSKP-E)
 - (1) The CSKP-E is installed into the personal computer and used.
 - (Example) Software structure diagram for Ethernet connection



*1 The UDP/IP communication for using CSKP-E will be planned in the future.

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(2) Ample support of communication protocols

The personal computer side user can easily access the PLC's CPU by designating the connection type and communication request details using the following CSKP-E data link function arguments.

* The user does not need to understand the communication syntax unique to the special function module on the PLC side. The connection procedure can be changed just by changing part of the program (mdOpen argument's communication channel No.) in the program created by the user.

Once created, the user program can be used effectively.



- (3) Data link functions dedicated for communicating data with PLC are supported
 - Functions required for communicating data with the PLC, such as communication line open/close and device read/write, are prepared as data link functions.
 - Various communication programs can be created easily, so development of the communication system using Ethernet/serial communication, etc. with the PLC side is easily.

Function name	Data link function's function
mdOpen	Initializes and opens the designated communication line channel.
mdClose	Closes the designated communication line channel.
mdSend	Writes the data in a batch to the designated device.
mdReceive	Reads the data in a batch from the designated device.
mdRandR	Reads data from a randomly designated device.
mdRandW	Writes the data to a randomly designated device.
mdDevSet	Sets (ON) the designated bit device.
mdDevRst	Resets (OFF) the designated bit device.
mdControl	Carries out remote RUN/STOP/PAUSE in respect to the designated
mucontrol	PLC CPU.
mdTyperead	Reads the type of designated PLC CPU.

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(4) Various utilities are enclosed

The communication between the PLC and personal computer can be tested and monitored with the communication diagnosis utility and device monitor utility enclosed with the product.

2. Examples of using basic communication support tool (CSKP-E)

Programming procedures and program examples for connecting to the PLC's Ethernet interface module and computer link module and accessing the PLC's CPU from a personal computer are described in this section.

For the program example, the personal computer reads the data register (D) in the A/QnA Series PLC CPU, and displays the results on the screen.

- 2.1 Examples of using with Ethernet connection
 - (1) Programming procedures (Outline flow of procedures)

The flow of the data read process for creating a personal computer side program to access the PLC CPU using CSKP-E is shown below.



1) Ethernet utility settings

Set the module type (E71, QE71), host name (IP address) and port No., etc., of the PLC to be communicated with over an Ethernet connection. This information is saved as a logic station No.

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2) mdOpen This fund The path The path function	ction initializes and opens of the opened communica is required to execute the (mdClose) for closing the l	the Ethernet communica tion line is returned as tl function (mdReceive) fo ine.	tion line channel (No. = 61). ne execution results. r reading the PLC data, and the
3) mdRecei This fund The targ argumen	ve ction reads the PLC CPU's et PLC's logic station No., it.	device data. , device to be read and N	No. of points are assigned to the
4) mdClose This fund The com	ction closes the opened com munication line must be clo	nmunication line channe osed when reading and w	l. vriting are completed.
(2) Programmir	ng example (Using Visual (C++)	
The D0 an communicat	d D1 values of the targ tion line, and are displayed	get PLC CPU are read I on the screen.	d over the logic station No. O
/*************************************	*******	**** * *****/	

#include <stdio.h> #include <windows.h> /* Windows include file */ #include "mdfunc.h" /* Data line function include file */ * Constant declaration #define CHSN_ETHERNET 61 /* Ethernet communication channel (common for E71, QE71)*/ #define MODE_DUMMY -1 /* Dummy (fixed to -1) */ #define STNO_ROGIC 0 /* Logic station No. */ #define 13 /* Device type "D" DEVTYPE_D */ #define DEVNO_0 0 /* Read top device No. */ #define SIZE_R_BYTES 4 /* No. of read data bytes */ #define DATA_INITIAL 0 /* Read area initial value */ * The logic station No. "0" PLC data is read. * The logic station No. is preset with the Ethernet utility. void main() { /* Declare mdOpen argument */ /* Path save function long path; */ short chan; /* Communication line channel No. */ /* Dummy (fixed to -1) short mode; */ /* mdOpen function return value short oret; */ /* Declare mdReceive argument */ /* Station No. */ short stno; /* Device type short devtyp; */

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short devno; short size;		/* Read top device No. /* No. of read data bytes	*/ */
short data[2]; short rret;		/* Read data butter /* mdReceive function return value	*/ */
/* Declare mdC short cret;	lose argument */	/* mdClose function return value	*/
/* Declare mdO chan = CHSN mode = MODI /* Execute mdC	Peen argument setting */ N_ETHERNET; E_DUMMY; Open and open line */	/* Ethernet communication channel /* Dummy (fixed to –1)	*/ */
if(oret != 0){ /* If fun printf("	nction fails, return error 'mdOpen error[%04x]\n",	*/ oret);	
/* Conti	nue process only when mo	lOpen succeeds. */	
/* Set m stno devtyp	ndReceive argument = STNO_ROGIC; = DEVTYPE_D; - DEVNIQ_0;	*/ /* Logic station No. /* Device type "D" /* Poad dovico No. 0, 1	*/ */
size data[0] data[1]	= DEVINO_0; = SIZE_R_BYTES; = DATA_INITIAL; = DATA_INITIAL;	/* Read device 140. 0, 1 /* 2-point, 4-byte (word device is 1-po /* Initialize read data area */	oint 2-byte)*/
/* Exect /* Use p	ute mdReceive and read path acquired with mdOpe	n */	
if(rret !	!= 0){ /* If function fails, return	error */	
}else{	printf("mdReceive error[9	604x]\n", rret);	
	/* Display read data printf("data0 [%4x]\n", da printf("data1 [%4x]\n", da	*/ ata[0]); /* Data display */ ata[1]); /* Data display */	
} /* Execu /* Use p cret = m	ute mdClose and close line bath acquired with mdOpe ndClose(path);	*/ n */	
	/* If function fails, return printf("mdClose error[%0	error */ 4x]\n", cret);	
} } }			

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- 2.2 Examples of using with computer link connection
 - (1) Programming procedures (Outline flow of procedures)

The flow of the data read process for creating a personal computer side program to access the PLC CPU using CSKP-E is shown below.



1) Computer link utility settings

Set the computer link module/serial communication module type (C24, UC24, QC24), module station No., and COM port communication conditions of the PLC to be communicated with over a computer link connection. This information is saved as a logic station No.

2) mdOpen

This function initializes and opens the serial communication line channel (serial port (COM port) channel No. = 31 to 40).

The path of the opened communication line is returned as the execution results.

The path is required to execute the function (mdReceive) for reading the PLC data, and the function (mdClose) for closing the line.

3) mdReceive

This function reads the PLC CPU's device data.

The target PLC's logic station No., device to be read and No. of points are assigned to the argument.

4) mdClose

This function closes the opened communication line channel. The communication line must be closed when reading and writing are completed.

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(2) Programming example (Using Visual C++)

The D0 and D1 values of the target PLC CPU are read over the logic station No. 0 communication line, and are displayed on the screen.

* Include #include <stdio.h> #include <windows.h> /* Windows include file */ #include "mdfunc.h" /* Data line function include file */ * Constant declaration #define CHSN_COM1 31 /* Computer link communication channel (common for C24, UC24, QC24) */ #define MODE_DUMMY -1 /* Dummy (fixed to -1) */ #define /* Logic station No. STNO_ROGIC 0 */ #define DEVTYPE D 13 /* Device type "D" */ /* Read top device No. #define DEVNO_0 0 */ #define SIZE_R_BYTES 4 /* No. of read data bytes */ #define DATA_INITIAL 0 /* Read area initial value */ * The logic station No. "0" PLC data is read. * The logic station No. is preset with the computer link utility. * ****** void main() { /* Declare mdOpen argument */ /* Path save function long path; */ /* Communication line channel No. */ short chan; short mode; /* Dummy (fixed to -1) */ /* mdOpen function return value short oret; */ /* Declare mdReceive argument */ /* Station No. */ short stno; short devtyp; /* Device type */ /* Read top device No. short devno; */ short size: /* No. of read data bytes */ short data[2]; /* Read data buffer */ /* mdReceive function return value short rret; */ /* Declare mdClose argument */ short cret; /* mdClose function return value */ /* Declare mdOpen argument setting */ /* Computer link communication channel chan = CHSN_COM1; */ mode = MODE_DUMMY; /* Dummy (fixed to -1) */ /* Execute mdOpen and open line */ oret = mdOpen(chan, mode, &path);

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<pre>if(oret != 0)</pre>	<pre>{ function fails, return error tf("mdOpen error[%04x]\n", ontinue process only when mo it mdReceive argument = STNO_ROGIC; yp = DEVTYPE_D; i0 = DEVNO_0; = SIZE_R_BYTES; [0] = DATA_INITIAL; [1] = DATA_INITIAL; tecute mdReceive and read se path acquired with mdOpel = mdReceive(path, stno, devi tet != 0){ /* If function fails, return printf("data1 [%4x]\n", data printf("mdClose and close line se path acquired with mdOpel = mdClose(path); tet != 0){ /* If function fails, return printf("mdClose error[%0] </pre>	<pre>/*/ oret); Open succeeds. */</pre>	No. 0, 1 'D'' No. 0, 1 te (word device is ad data area */ ad data area */ ad data); */ display */ display */ http://	*/ */ 1-point 2-byte)*/

3. Basic communication support tool (CSKP-E) operation environment (outline)

Product name	CSKP-E operation environment
CPU (memory) ^{*1}	Pentium 100MHz or more (32MB or more)
Comaptible OS	English Windows 95/98, or English Windows NT. Workstation 4.0*2
Programming software	Visual Basic 4.0/5.0, Visual C++4.2/5.0

*1. A multiprocessor compatible personal computer cannot be used.

*2. Service Pack 3 and above is required.

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