SOFTWARE SP798-11

128 ALARMTEXT MONITOR WITH 40 CHARACTER MESSAGES

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I. INTRODUCTION

The NCM-798 module with software package SP-798-11 establishes an easy way of communicating with the PC-700 or -900 on the operator's level, and is an aid in programming and monitoring actual process conditions.

This manual is divided into four main sections:

a. General Description

   The NCM-798 module with SP-798-11 is introduced, peripheral equipment is identified and all special fucntion keys on the terminal are described.

b. Terminal Command Description

   All available commands are described, and examples of the commands and the response of the module are given.

c. PC Command Description

   The input and output registers of the module are described bitwise, and some examples of valid instructions to the module are given.

d. Integrity Checks

   The meaning of the front panel status LED is described, and the system's response to internal failure of the module is given.

II. GENERAL DESCRIPTION

The NCM-798 module with software package SP-798-11 allows the user to communicate in a simple way with the PC-700 or -900.

The software package supports a terminal (connected to the A Port) and a printer (connected to the B Port).

Print-outs of user program texts and/or register contents can be given on both ports.

Commands to the PC can be given by the terminal port (A port) only. (See Section III).

Both the terminal and printer should have a RS-232 or current loop (0-20 mA) interface and can be of any type.

On power up, both ports will send the message:

WESTINGHOUSE SP-798-11

to the connected peripheral, to indicate all functions are working properly.

The terminal has two modes of operation:

The open and closed terminal mode.

In the closed terminal mode the terminal acts as a printer. In the open terminal mode the operator is allowed to given commands or program the module with user data.

The following special keys can be used by the operator.

CTRL-O Open the terminal for operators communication
Terminal response:
-When in open mode, the module responds with the > sign

CTRL-C Close the terminal
Terminal response:
-The module responds with the < sign

CTRL-X Delete all inputted characters
Terminal response:
-The module responds with ^

CTRL-D Show all inputted characters
Terminal response:
-All characters are shown on the next line

CTRL-H Delete last inputted character
Terminal response:
-The deleted character will be echoed again

Any inputted string of characters should be terminated with one of the four commands delimiters /, =, (CR) or (LF)

Where: (CR) = carriage return key
(LF) = line feed key

III. COMMAND DESCRIPTION

A command can be given to the NCM-798 module only when the operator has opened the terminal.

The terminal will be opened by pressing simultaneously the control and "O" keys.

To indicate an open terminal, the module responds with: >

A closed terminal is indicated by the < sign and results from either a time-out or depressing simultaneously the control and "C" keys.

Time-outs occur 30 seconds after the last key has been depressed.

The valid default commands are:

CTIM for changing system time (see III.1)

CTXTNNN for changing text (see III.2)

CCOMNN for changing user programmable commands (see III.3)

SBITH for setting a bit in the PC user-defined register (see III.4)

CWRDH for setting a value in the PC user-defined register area (see III.5)

where: N = any (ascii) decimal number (0-9)
H = any hexadecimal number (0-F)

Any command should be terminated with one of the four command delimiters:

/ Command delimiter 1 (echo on same line)
= Command delimiter 2 (echo on same line)
CR Command delimiter 3 (echo on next line)
LR Command delimiter 4 (echo on next line)

When a non-valid command has been entered, the module will respond with a question mark, and the open (>) sign on the next line. A new command can then be entered.

III.1 CHANGE SYSTEM TIME

After the terminal has been opened by the operator, the command CTIM allows updating of the system time. After depressing any command delimiter, the NCM module will respond with the actual system time:

HH:MM:SS /

where: HH = hours (00-23)
MM = minutes (00-59)
SS = seconds (00-59)

After the slash, the new time can be entered.

If the command delimiter used is (CR) or (LF), the time will be echoed on the next line. In the case of the "/" or "=" command delimiter, the time is echoed on the same line.

Command Examples (operator's action is underlined; comments shown at right):

<_	Control O entered to open terminal
>CTIM(CR)	Change Time command entered
12:33:06 /13:33:00/	Time displayed, new time entered
>CTIM/13:33:08 //	Time command again, no change of time
>_	Control C entered
<	Terminal closed

III.2 CHANGE TEXT

After the terminal has been opened by the operator, the command CTXTNNN (where NNN is any decimal number between 000 and 127) allows updating of the appropriate text. After depressing any command delimiter, the NCM module will respond with the actual text of 40 characters maximum.

After the slash (/), the new text may be entered. When only a command delimiter is typed in, the text will remain unchanged.

Special control is performed when the command delimiter (LF) (linefeed) is used. The module will respond with the text of the next point (NNN+1), and gives the opportunity to change the next text.

Command Examples (operator's action is underlined; comments shown at right):

<_	Control O opens terminal
>CTXT000 /_ OLD TEXT	Text is "old text"
/ NEW TEXT/	Changed into "new text"
>CTXT000 /_ NEW TEXT (LF)	LF function
001 / TEXT NUMBER ONE/	
>CTXT127 /_ LAST TEXT	Control H and Control D functions
/ SHOW RUBOUT FUNCTIONNOITCNUF (CNTL D)	
SHOW RUBOUT/	
>CTXT127/ SHOW RUBOUT//_	No change
>_	Control C entered
<	Terminal closed

III.3 CHANGE COMMANDS

The commands SBIT0 to SBITF and CWRD0 to CWRDF are extended with a user programmable command string of eight characters each, by means of the CCOM command. After the terminal has been opened, the command CCOMNN allows updating of these command strings.

NN may have any decimal value between 01 and 32. The first 16 numbers are assigned to the commands SBIT0 to SBITF, and the last 16 numbers to CWRD0 to CWRDF.

After depressing any command delimiter, the NCM module will respond with the actual command text. String length is limited to eight characters. After the "/" the new command text may be entered. If only a command delimiter is typed in, the string will remain unchanged.

Command Examples (operator's action is underlined; comments shown at right):

<_	Control 0 entered
>CCOM01/XXXXXXXX/START-OD/	Command SBIT0 available as XXXXXXXX is changed into START-OD
>CCOM01/START-OD//	
>CCOM17/DEFAULT!/PARAM.01/	Command CWRD0 is also available as DEFAULT!
>CCOM17/PARAM.01 CR	and is changed into PARAM.01
>_	Control C entered
<	

From now on, the commands START-OD and PARAM.01 will have the same result as SBIT0 and CWRD0.

III.4 SET BIT OPERATION

The commands SBIT0 to SBITF allows the user to set a single bit in a user predefined holding register. All other bits in this register will be set to zero.

The commands will usually have an application-determined meaning. Therefore, a user programmable command string can be implemented to obtain a more understandable operator function (see: Change Commands).

The command SBITH (H is any Hexadecimal value) should always be terminated with one of the four command delimiters. No response but the open sign (>) will be given to the operator.

Command Examples (operator's action is underlined; comments shown at right):

>SBIT0/	Set bit one in PC holding register.
>SBIT3(CR)	Set bit four in holding register
>SBITF/	Set bit sixteen in PC holding register
>_	
<	

III.5 CHANGE REGISTER CONTENTS

The command CWRDH (where H is any hexadecimal value) allows the operator to set a value in one of the user-predefined PC registers. The command should be terminated with one of the four command delimiters and the NCM module will respond with the last programmed value of the appropriate word (a word is a 4 digit hexadecimal number). Behind the slash, the word's new value can be entered. If no character but the command delimiter is entered, the value will remain unchanged and no data transfer to the PC will be performed. These commands usually will have a specific meaning. Therefore, a user programmable command string can be implemented to obtain a more understandable operator function (see: Change Commands).

Command Examples (operator's action is underlined):

>CWRD0/5678 / F3F7/

>CWRDB/0000 / 1234(CR)

>CWRDF/8833 //

>_

<

IV. PC COMMAND DESCRIPTION

From the PC point of view, the NCM-798 module is a combination of a 16 bit output register and a 16 bit input register. Commands from the PC to the module can be given by simply writing into the output register. Commands from the module to the PC can be read from the input register.

The meaning of the various bits in these registers is shown by Figures 1 and 2.

16	15	14	13	12	11	10	9	
Print Text	Print Binary Number	Print Hex Number	X	To A Port	Print Time	Print CRLF	Print Text Number	

Bits 8 through 1 show text number or bytecount

Figure 1. OR

16	15	14	13	12	11	10	9	
A Port Busy	B Port Busy	Update Bit Reg.	Update Reg. Area	X	Bit Reg.			

If b14=1, b8 to b1 = Bit Data
If b13=1, b8 to b1 = Offset (1 - 16)

Figure 2. IR

In general, any printout command to one of the NCM ports, should be given under the condition that the port is not busy (b16 or b15 in IR). Commands from the module to the PC may occur at any time.

IV.1 PRINTING OF TEXT

To print text, a valid command should be in the output register during one PC I/O cycle.

If the text is to be preceded by its alarm number or the time of event, corresponding bits should also be set to non-zero. Automatic printing of carriage return and line feed can be generated after the text by setting the corresponding bit to non-zero.

Command Examples:

a 1000 0000 0000 0000

Results in printout of text 000 to the B port, without time, alarm number and CRLF.

```
TEXT0*
```

Cursor position is marked by *.

b 1000 1000 0000 0111

Results in printout of text 007 to the A port, without time, alarm number and CRLF.

```
TEXT7*
```

c 1000 1111 0000 0111

Results in printout of text 007 to the A port. Message will be preceded by the time of event, its alarm number and CRLF will be printed afterwards.

```
12;45;13; 007 TEXT7
*
```

IV.2 PRINTING OF REGISTER CONTENTS

To print one or more register contents, a valid command should be in the output register during one PC I/O cycle.

The number of bytes to be printed out is indicated by bit 8 - bit 1.

The choice of the port is indicated by bit 12 and automatic printing of CRLF after each byte can be obtained by setting bit 10.

During the following PC I/O cycles, the actual values of each byte to be printed should be in the output register.

Command Examples:

0100 1x1x 0000 0011	Results in printing 3 bytes in binary format on port A with CRLF x = default
for example:	
010010001111 101111011111 010101010101 *	* = cursor position after printout.
0010 1x0x 0000 0010	Results in printing 2 bytes in hex format on port A with no CRLF
for example:	
481F 3315 1234 *	* = cursor position after printout.

V. INTEGRITY CHECKS

During runtime, an in-line RAM and ROM test is performed continuously.

If any error is found, the module attempts to respond on port B with:

MEMORY P-ERROR in case of a PROM error.

or

MEMORY R-ERROR in case of a RAM error.

No checks are made on the battery back-up RAM, since errors in this data are not fatal for operation.

The status LED in the front panel of the NCM-798 module indicates active transmission with the PC-700 or -900.

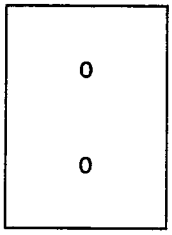
If the PC is in run mode, the LED will light as a result of the intermediate activation on the PC's I/O cycle. When the PC is not running for any reason, the LED will be off.

BATTERY BACK UP

A battery maintains the CMos memory for a minimum of ten days. To enable the battery, the jumper located below the battery and indicated with "BATT ON", must be installed.

The module is shipped with battery disabled.

Strappings seen from the edge connector side:



Battery on enabled

Battery off disabled