

Display Interface Module Reference

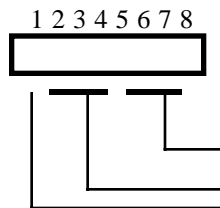
General Description

The display interface provides a connection for a LCD 4x20 display to the SM800 expansion I/O bus. There are two addresses reserved for displays (address 0 and 16). Either 0, 1 or 2 displays can be used on one SM800. Either display can be used to display a) points from Table 1, or b) free-form messages from a Basic program. Address 0 is selected by JPR 1, 1-2. Address 16 is selected by JPR 1, 2-3.

The display interface provides for 4 keys for display control. (Up, Down, Left, Right) The key inputs automatically operate the table 1 display and allow for operator entry of parameter values/states. In either Table 1 mode or Basic display mode, the key inputs as well as line and field indicators are available in registers if desired.

Table 1 display mode- (JPR 2, 1-2)

The Starting Line number and the number of lines to be displayed can be selected by Dip switch on the module. Also, a Dip switch can be selected to enable or disable parameter entry from the display keys.



Total number of lines x 4 (sw6-8) (up=1 bit)
 First Line x 8 (sw2-5) (up=1 bit)
 Allow Oper Entry if ON (down)

In the Table 1 display mode, these arrow inputs control which lines are currently displayed and which fields are displayed. The information displayed for each point includes the point name, a two character identifier of the parameter displayed, and the parameter (either numeric value or a current state label, eg, ON/OFF).

The display will always show the point name(s) in the left most eight characters of the display. The right most seven characters will contain the associated parameter (as selected by the operator). The parameters available (in order of appearance)(right arrow sw) are:

For digital points:	Indicator
Current state	'blank'
Cycle count (starts)	CY
Elapsed time (on time in tenths of hours)	ET
For analog points:	Indicator
Current value	'blank'
Maximum value	MX
Minimum value	MN
High Limit value (or set point)	HL
Low Limit value (or set point)	LL

Basic Program Mode (JPR 2, 2-3)

Note that key input registers can be available for program use.

To write to display module 0 in Basic mode, use a File 10 statement in the Basic program to redirect 'print' output to the display. A File 11 statement can be used to send a single cursor position character in the range of 0 to 79. (i.e., CHR\$(0)). Note: use a semicolon terminator on print output to suppress the normal cr and lf characters at the end of the print data.

To write to display module 16 in Basic mode, use a File 12 statement in the Basic program to redirect 'print' output to the display. A File 13 statement can be used to send a single cursor position character in the range of 0 to 79. (i.e., CHR\$(0)). Note: use a semicolon terminator on print output to suppress the normal cr and lf characters at the end of the print data.

If carriage returns are sent to the display, the remaining portion of the current line will be blanked and the cursor moved to the left most (0) column of the current line.

If a line feed character is sent to the display, the cursor will move down one line and will cause lines to scroll up one line if the cursor is in the bottom line.

If no carriage return or line feed characters are sent to the display, the cursor position will wrap from character position 79 to character position 0. Also, the cursor will wrap from the end of one line to the start of the next.

Note that the displayed cursor indicates where the key operations position it, as opposed to where program writes occur (program refresh cursor). The program refresh cursor position must be explicitly sent to the display module or the data sent to the display will be placed following the last output data.

Register data associated with display module

The following analog input registers are available for the display module(s). They contain key status and positioning information for potential program use.

Register 0	-Key press bits (1=pressed) (bits 0-3) (Bit0= Up, 1=Right, etc.)
Register 1	-First Line to display (dip sw 2-5 times 8)
Register 2	-Total number of lines to allow display (scrollable) (dip sw 6-8 times 4)
Register 3	-Current Line (top display line)
Register 4	-Current Field (0=left, 4=right most)
Register 5	-Left/Right half of screen indicator. (see data entry section)
Register 6	-Cursor (selection) line (0-3= line of physical display containing cursor)

Note: To determine absol. line # for visible cursor position, add registers 2, 3, and 6.

Data Entry- Table 1 Display mode

Data entry (modification of displayed parameters) is permitted if Dip sw 1 is in the DOWN (closed) position. There is provision to parallel this switch with an external contact (HDR3-1) for lock and key security, etc.

If the cursor is in the left half of the line, up/down keys will scroll lines selected (and displayed). If the cursor is in the right half of the line, up/down keys will increment (up) or decrement the parameter shown. (Toggle the current state for digital state value)

Note: In Basic mode, the keys affect the register variables and the key presses can be detected by the program, however any entry or modification of display data or parameters is completely up to the program.

Jumpers / Connectors:

